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MARITAL AND OCCUPATIONAL STATISTICS OF GRADUATES OF MOUNT HOLYOKE COLLEGE.

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The present hour echoes with criticism of the educational system in the United States, and a large share of it is directed toward higher education. Not at first ready to admit that its value can be determined by objective tests, the college world begins today, in the face of attack, to realize that it has not at hand the information wherewith to take account of itself.

The increasingly large number of college women has in recent years provoked much interest in questions concerning the part their training plays in whatever activity follows graduation. In what proportion do college women marry? it is asked. How long is marriage delayed for them? How large is the average family? What success do college women meet in professional life, and what is the standard of that success? What professions do they enter and what is the quality of their contribution to them? What is their earning capacity?

An attempt to obtain answers to these and similar questions uncovers the narrow basis upon which our present information rests. The little quantitative work that has been done is insignificant as a measure of the present situation in this country, and whatever connection exists between college training and the now considerable scientific, literary, and professional work done by women, calls for more complete exposition than it has yet had.

Eleven years ago there appeared in the publications of the American Statistical Association * the most significant statis-

* Quarterly Publications, Vol. VIII, new series, 49, 50.

tical study of college and non-college women which has yet been made. It was the work of Dr. Mary Roberts Smith and has furnished much suggestion for this study. The college group with which it dealt was limited to married women and numbered only 343. It consisted of graduates of 28 American and 2 foreign institutions; the former including 5 colleges for women exclusively, 8 state universities, and 2 medical schools.

The passing of nearly three college generations under changing educational and social conditions since this study was made, the importance of collecting information concerning those who remained single, in addition to the facts pertaining to those who married, and the advisability of securing a larger basis in the number of women, are among the considerations which support the present investigation.

The material used is the returns from 2,827 schedules out of a total of more than twice that number, sent out in the autumn of 1910 to the living graduates of Mount Holyoke Seminary and college. This was done primarily to collect data for a general catalogue, but a further opportunity was made use of to secure at the same time, information which would make possible a study of the vital statistics and the occupational activity of the alumnae of the institution. For this purpose, an additional blank was prepared and sent to each graduate.

As the returns came in, there was transferred to these supplementary blanks from the main catalogue schedule, information as to the place and date of birth, and facts regarding graduate honors, post-graduate degrees, and further training. Valuable assistance in the tabulation was given by Miss Alzada P. Comstock, Mount Holyoke 1910, during the past year a graduate student in Economics and Sociology.

The material used falls into two separate groups: (1) The alumnae of the Seminary, 1842–1892; (2) the alumnae of the College, 1889–1910.

While the interest centers particularly in the question of the influence of the *college* education of women upon the character of marriage and occupational life, it was considered a great loss to throw aside the data from the earlier period, the years before the college charter was applied for.

During the greater part of that time, Mount Holyoke Seminary was the foremost institution for the higher education of women, and before the day of colleges offered to the women of the country their widest opportunity. Furthermore, we have here the possibility of making comparisons of the experience of the two periods which are significant of the character of fundamental changes that have taken place.

I. The Seminary Graduates.

An attempt to tabulate the occupations of the seminary graduates was abandoned because the information given was extremely uncertain and vague in character; which presumably was due to the fact that in many cases a long period of years intervened between the time of employment and the present, and the further fact that woman's work, of the kind in which these women engaged, was then so little standardized, that reference to it was, of necessity, indefinite, and therefore almost impossible of generalization. Therefore, the study of this group has been restricted to:

(1) The conjugal condition of the entire group.
(2) Occupations of husbands of married members.
(3) Age at marriage.
(4) Child-bearing capacity.
(5) Facts concerning the sex and health of children.

It is probable that a larger proportion of the women students of the earlier day were single-minded in the pursuit of learning. Because she was a greater rarity, and because her choice ran counter to the ideal then held for her sex, the mid-century woman student was, in a subtle way, set apart from other girls and forced to endure being regarded eccentric as the price of the privilege of study. Of this fact contemporary literature gives evidence. She was a blue-stocking. Today, on the other hand, going to college is, in many circles, a distinct social asset. Parents consider the connections made during college valuable as affecting later social position, so that the love of learning may be, and often is, a secondary motive.

These facts have a bearing on the marriageability of the two groups. Was the earlier group, in point of fact, distin-

guished in a way to make its members less marriageable than the corresponding one which followed it? It is somewhat surprising to observe that its marriage rate is higher, not lower. Two facts must be remembered: first, that the actual number of this group was very small, evidently smaller than a certain demand for just the qualifications they possessed, which was even then unaffected by the above considerations; second, that the general marriage rate of the time, operated in favor of the early group. Exactly to what extent this was the case cannot be determined, as we do not know the population group of which they were part, and so are not enabled to make comparison with the figures of the census.

TABLE I.

CONJUGAL CONDITION OF 1076 SEMINARY GRADUATES OF THE CLASSES OF 1842–1892, CLASSIFIED BY DECADES.

Decade of Gr uation.	Single.		Married.		Legally Separated.
	Number.	Per Cent.	Number.	Per Cent.	Number.
1842–1849	6	14.6	35	85.4	..
1850–1859	40	24.5	123	75.5	..
1860–1869	106	39.1	165	60.9	1
1870–1879	95	40.6	139	59.4	2
1880–1889	126	42.4	171	57.6	..
1890–1892	35	50.0	35	50.0	..
Totals	408	37.9	668	62.1	3

Table I sets forth the facts of the conjugal composition of the group. The striking feature is the uninterrupted and rapid decrease in the percentage of women marrying in each decade of graduation, a decrease of 35.4 per cent. in the fifty-year period.

These returns exhibit what are within negligible fractions the ultimate proportions, as very few marriages are now to be anticipated from even those who graduated as late as 1892, the last year (See Table III.) "Married" here includes widows. It is to be noted that no divorces were reported and only three cases of legal separation.

The only obtainable indication of the classes into which these women married, is the occupations of the husbands, which were reported as follows:

TABLE II.

OCCUPATIONS OF HUSBANDS OF MARRIED SEMINARY GRADUATES, CLASSIFIED BY DECADE OF WIFE'S GRADUATION.

Occupations.	1842–49.	1850–59.	1860–69.	1870–79.	1880–89.	1890–92.	Total.
Business Men	9	24	41	29	60	11	174
Clergymen	15	29	16	21	16	6	103
Teachers	..	6	12	12	12	3	45
Physicians	1	4	16	8	12	3	44
Lawyers	2	11	10	8	10	1	42
Farmers	..	6	7	10	9	4	36
Engineers	..	2	2	4	3	2	13
Missionaries	1	1	3	4	3	..	12
School Superintendents	..	..	1	4	2	..	7
Writers	..	3	3	1	..	..	7
Government Officials	..	..	..	1	4	..	5
College Presidents	1	..	1	..	1	..	3
Miners	..	1	1	..	1	..	3
Scientists	..	..	..	..	3	..	3
Architects	..	..	1	1	..	..	2
Dentists	..	..	1	1	..	..	2
Musicians	..	1	1	..	..	..	2
Secretaries	..	..	1	1	..	..	2
Army Officer	..	1	..	..	..	..	1
Artist	..	..	..	1	..	..	1
Curator	..	..	..	..	1	..	1
Journalist	..	..	..	..	..	1	1
Lecturer	..	..	..	1	..	..	1
Optician	..	..	..	..	1	..	1
Pharmacist	..	..	1	..	..	..	1
Physical Director	..	..	..	..	1	..	1
Sea Captain	..	..	..	..	1	..	1
	29	89	118	107	140	31	514

By far the largest number married business men, who constitute 33.8 per cent.; clergymen follow at 20 per cent.; and teachers and physicians are each 8.7 per cent. of the total; while 257, or exactly 50 per cent., were reported to be college graduates.

Scarcely second in importance to the number marrying, as a fact affecting the general population, is the age at marriage, which is significant not only because of its influence on the birth rate, but because it determines much of the character of the family life. The questions of first interest are: How much did the additional years spent on education delay marriage, and what effect did this have on the birth rate?

The average age at marriage is the more easily determinable, and reaches the surprisingly high point of 27.21 years. (The small number marrying after the age of 40 are not included in the tabulation.) The decade following 1870 shows the highest average age, namely 30.57. This period is coin-

cident with years of economic depression, which is probably a contributing factor to the delay of marriage.

TABLE III.

NUMBERS AND PERCENTAGE OF 535 SEMINARY GRADUATES OF 1842–1892 MARRYING AT SPECIFIED AGE, CLASSIFIED BY DECADE OF GRADUATION.

Age at Marriage.	Number of Women Marrying at Specified Age.							
	1842–49.	1850–59.	1860–69.	1870–79.	1880–89.	1890–92.	Totals.	Per Cent.
19	1	2	..	..	..	..	3	.6
20	2	4	2	..	..	..	8	1.5
21	..	4	2	2	4	..	12	2.2
22	3	6	8	5	8	1	31	5.8
23	4	9	7	7	10	1	38	7.1
24	3	8	10	12	18	3	54	10.1
25	6	10	21	18	18	4	77	14.4
26	2	4	8	9	8	3	34	6.4
27	2	4	15	9	19	6	55	10.3
28	2	6	8	8	11	2	37	6.9
29	..	2	9	4	11	..	26	4.9
30	1	6	5	9	6	3	30	5.6
31	2	1	10	8	4	1	26	4.9
32	..	2	4	5	3	..	14	2.6
33	1	5	9	3	2	..	20	3.7
34	..	1	2	1	3	2	9	1.7
35	..	4	6	5	3	..	18	3.4
36	1	1	2	4	3	2	13	2.4
37	..	..	1	3	8	1	13	2.4
38	..	3	1	1	3	2	10	1.9
39	..	1	..	1	1	1	4	.7
40	1	..	1	..	..	1	3	.6
Totals	31	83	131	104	143	33	535	100
Average age	25.87	27.53	27.73	30.57	27.62	29.27	27.21	

Fifty per cent. of the graduates of 1842–49 married before the end of their 26th year.
" " " " " " 1850–59 " " " " " " 26th "
" " " " " " 1860–69 " " " " " " 28th "
" " " " " " 1870–79 " " " " " " 27th "
" " " " " " 1880–89 " " " " " " 28th "
" " " " " " 1890–92 " " " " " " 28th "
" " " " " whole period " " " " " " 28th "

Figure 1 portrays graphically the number of marriages at different ages. Note the rapid increase from 0.6 per cent. at 19, to the highest point reached at 25 years. The fall is even more rapid to exactly the same point (0.6 per cent.) at 50. No explanation is here advanced for the rise at 27, but it is of interest to note that exactly the same thing occurs at that age in the curve for the college graduates.

When classifying the women by age groups it will be seen that the preponderance of marriages occurred in the group between the years 23 and 32 (73.08 per cent.); only a little over 10 per cent. marrying before 23, and not quite 17 per cent. after the age of 32 has been reached.

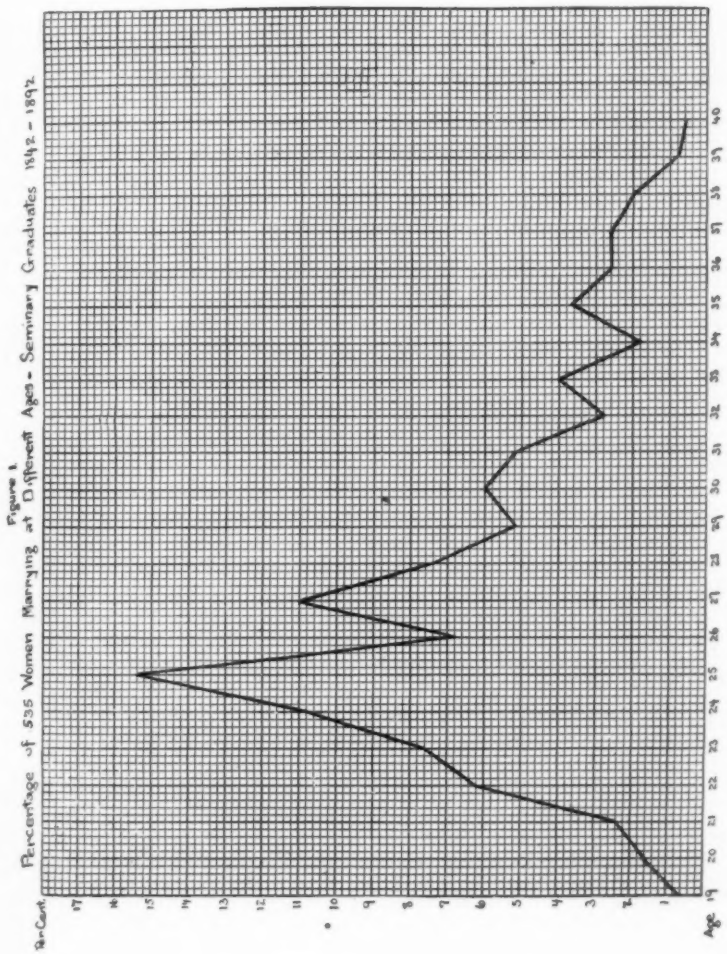
Figure 1
Percentage of 535 Women Marrying at Different Ages - Seminary Graduates 1892 - 1892
Per Cent.
Age

To gain a correct idea of the fecundity of this same group, one must consider the number of children in connection with: (1) the age at marriage, and (2) the number of child-bearing years included in the period of married life. For the large majority, the child-bearing years were already past when the schedule was filled. Therefore, it was necessary to take from the whole number of years the period subsequent to the menopause, or subsequent to the death of the husband. This was done in all cases so classifying; the end of the child-bearing years being taken as the time when the woman had reached the age of 50.*

TABLE IV.

CHILDREN BORN TO 535 WOMEN, CLASSIFIED BY AGE OF MOTHERS AT MARRIAGE AND BY DECADE OF THEIR GRADUATION.

Age of Mother at Marriage.	Number of Children Born						
	1842–49.	1850–59.	1860–69.	1870–79.	1880–89.	1890–92.	Total.
19	6	9	..	..	..	..	15
20	8	20	2	..	..	..	30
21	..	20	7	10	12	..	49
22	15	16	23	16	28	4	102
23	12	31	27	30	23	1	124
24	9	32	37	38	57	6	179
25	12	42	64	40	50	13	221
26	4	17	29	21	22	5	98
27	11	15	39	22	40	10	137
28	4	27	25	23	41	4	124
29	..	6	23	6	26	..	61
30	1	18	16	19	20	9	83
31	1	2	18	12	5	1	39
32	..	4	7	12	5	..	28
33	2	14	19	9	..	..	44
34	..	..	4	2	8	3	17
35	..	6	2	18	6	..	32
36	1	..	..	2	8	3	14
37	..	..	1	6	8	1	16
38	..	2	3	..	4	..	9
39	..	..	..	..	..	2	2
40	..	..	..	..	..	1	1
Total	86	281	346	286	363	63	1,425

*Dr. Howard A. Kelly, in his Medical Gynecology gives a table showing the age of menopause in 200 cases. In comment he says: "It will be seen that the same number of cases (81) occurs between the ages of 50 and 55, as between 45 and 50; the two classes making more than 4-5 of the whole. . . . Different authorities give the age for the menopause as follows: Ashton: 45–50, Hirst: 45, Garragnes: 45–50, Hart and Barbour: 45, Montgomery: 47–50, Penrose: 45–50. Skene: 40–50; Gilliam: 47, Webster, who is one of the few writers going into detail on the subject, says: 'In temperate countries it takes place in about 50 per cent. of the women between 45 and 50, and in 25 per cent. between 40 and 45.'"

TABLE V.

THE FECUNDITY OF 535 WOMEN CLASSIFIED BY AGE AT MARRIAGE, AND BY DECADE OF GRADUATION.

Age at Marriage.	Total Number Child-bearing Years in Married life of Women Marrying at Specified Ages.							Average Number of Children Born to Each Woman.							Number of Child-bearing Years of Married Life to Each Child.						
	1842-49.	1850-59.	1860-69.	1870-79.	1880-89.	1890-92.	1842-92.	1842-49.	1850-59.	1860-69.	1870-79.	1880-89.	1890-92.	1842-92.	1842-49.	1850-59.	1860-69.	1870-79.	1880-89.	1890-92.	1842-92.
19	31	45	.....	.....	.....	.....	76	6.00	4.50	.....	.....	.....	.....	5.00	5.16	5.00	.....	.....	.....	.....	5.06
20	60	120	60	.....	.....	.....	240	4.00	5.00	1.00	.....	.....	.....	3.75	7.50	6.00	30.00	.....	.....	.....	8.00
21	.....	112	58	58	99	.....	327	.....	5.00	3.50	5.00	3.00	.....	4.08	.....	5.60	8.28	4.80	8.25	.....	6.67
22	83	165	197	124	204	18	791	5.00	2.66	2.87	3.20	3.50	4.00	3.29	5.53	10.31	8.56	7.75	7.28	4.50	7.75
23	108	187	177	189	201	18	880	3.00	3.44	3.85	4.28	2.30	1.00	3.26	9.00	6.03	6.55	6.30	8.73	18.00	7.09
24	53	204	260	295	427	42	1,281	3.00	4.00	3.70	3.16	3.16	2.00	3.31	5.88	6.37	7.02	7.76	7.47	7.00	7.15
25	150	218	509	450	383	64	1,774	2.00	4.20	3.04	2.22	2.77	3.25	2.87	12.50	5.19	7.95	11.25	7.66	4.92	8.02
26	47	96	192	203	159	43	740	2.00	4.25	3.62	2.33	2.75	1.66	2.88	11.75	5.64	6.62	9.66	7.22	8.60	7.55
27	46	81	314	192	362	81	1,076	5.50	3.75	2.60	2.44	2.10	1.66	2.49	4.18	5.40	8.05	8.72	9.05	8.10	7.85
28	44	113	169	164	198	29	717	2.00	4.50	3.12	2.87	3.72	2.00	3.35	11.00	4.18	6.76	7.13	4.82	7.25	5.78
29	.....	42	174	65	199	.....	480	.....	3.00	2.55	1.50	2.36	.....	2.34	.....	7.00	7.56	10.83	7.65	.....	7.86
30	20	111	100	172	104	32	539	1.00	3.00	3.20	2.11	3.66	3.00	2.76	20.00	6.16	6.25	9.05	5.20	3.55	6.49
31	38	9	173	152	59	10	441	.50	2.00	1.80	1.50	1.25	1.00	1.50	38.00	4.50	9.61	12.66	11.80	10.00	11.30
32	.....	36	66	90	42	.....	234	.....	2.00	1.75	2.40	1.66	.....	2.00	.....	9.00	9.42	7.50	8.40	.....	8.35
33	17	85	137	51	25	.....	315	2.00	2.80	2.11	3.00	.....	.....	2.20	8.50	6.07	7.21	5.66	.....	.....	7.15
34	.....	16	32	16	36	18	118	.....	.....	2.00	2.00	2.66	1.50	1.88	.....	.....	8.00	8.00	4.50	6.00	6.94
35	.....	60	90	75	36	.....	261	.....	1.50	.33	3.60	2.00	.....	1.77	.....	10.00	45.00	4.16	6.00	.....	8.15
36	14	14	28	56	25	11	148	1.00	.....	.....	.50	2.66	1.50	1.07	14.00	.....	.....	28.00	3.12	3.66	10.57
37	.....	.....	11	31	79	3	124	.....	.....	1.00	2.00	1.00	1.00	1.23	.....	.....	11.00	5.16	9.87	3.00	7.75
38	.....	36	12	12	25	9	94	.....	.66	3.00	.....	1.33	.....	.90	.....	18.00	4.00	.....	6.25	.....	10.44
39	.....	11	.....	11	9	3	34	.....	.....	.....	.....	.....	2.00	.50	.....	.....	.....	.....	.....	1.50	17.00
40	10	.....	6	.....	.....	4	20	.....	.....	.....	.....	.....	1.00	.33	10.00	.....	.....	.....	.....	4.00	20.00
Totals	721	1,761	2,765	2,406	2,672	385	10,710														
Average	.....	.....	.....	.....	.....	.....	.....	2.77	3.38	2.64	2.75	2.54	1.91	2.66	8.38	6.27	7.99	8.41	7.36	6.11	7.51

Inasmuch as we are here dealing with a group of women whose average age at marriage is somewhat late, and as the age for the menopause is known to be somewhat later in the case of late marriage, the age of 50 has been chosen, though this high average increases the number of child-bearing years during that part of the period when births are least frequent. Thus, we have avoided the possibility of making the fecundity of the women appear greater than it is.

It must be remembered that since all the data used are gathered from living persons, the fecundity is less than it would be if there were included in the group those whose child-bearing years were ended by the death of the wife before she reached her 50th year, since the number of births in the latter part of the period is, in every case, small. The number of child-bearing years as given in Table V covers the period from the date of marriage until the wife has reached the age of 50, unless the husband's death occurred previously.

The average number of children born to each woman, shown in the same table, indicates a gradual, but much interrupted decrease, from 5 children, when marriage occurred at the age of 19, to an average of 0.33 at 40.

Inspection of Table VI shows that, while childlessness is more frequent in late marriages, there is nevertheless no close correspondence between its percentage and the age at marriage. Of the total of 535 marriages of women whose child-bearing period is for the majority of them long past, 95, or 17.76 per cent. were childless. For the age at which marriage was most frequent, and for which the number of children is greatest, that is, where marriage occurred at 25, the per cent. of childless marriages is 18.18, thus exceeding the average for the group. Other influences evidently operate more effectively than age at marriage in determining the percentage of childless marriages.

TABLE VI.

CHILDLESS MARRIAGES IN A TOTAL OF 535 WOMEN, CLASSIFIED BY DECADE OF GRADUATION AND AGE AT TIME OF MARRIAGE.

Age at Marriage.	1842–49.	1850–59.	1860–69.	1870–79.	1880–89.	1890–92.	1842–92.	Total Number of Marriages.
19	..	..	..	..	..	..	..	3
20	..	..	1	..	..	..	1	8
21	..	..	..	..	..	..	..	12
22	..	..	2	..	2	..	4	31
23	..	1	..	..	1	..	2	38
24	1	1	1	2	..	..	5	54
25	2	..	3	3	6	..	14	77
26	1	..	1	1	1	1	5	34
27	..	..	3	1	3	1	8	55
28	..	..	..	2	..	1	3	37
29	..	..	..	1	..	..	1	26
30	..	..	..	3	..	..	3	30
31	..	..	2	4	1	..	7	26
32	..	1	1	1	1	..	4	14
33	..	1	4	1	2	..	8	20
34	..	1	..	..	1	..	2	9
35	..	2	4	1	1	1	9	18
36	..	1	2	3	..	..	6	13
37	..	..	..	..	3	..	3	13
38	..	1	..	1	1	2	5	10
39	..	1	..	1	1	..	3	4
40	1	..	1	..	..	..	2	3
Total Childless Marriages	5	10	25	25	24	6	95	
Total Number Marriages	31	83	131	104	143	33	535	

Questions concerning sex, mortality, education, marriage, and occupation of children were in many cases neglected or incompletely answered. For this reason the following tables, which include data from a larger number of schedules than the foregoing, while of value as furnishing comparison of the activity and mortality of the children of the two sexes, are not to be taken as exhibiting the facts about the whole number of children born.

TABLE VII.

SEX OF 1666 CHILDREN OF SEMINARY GRADUATES.

Decade of Mother's Graduation.	Male.		Female.	
	Number.	Per Cent.	Number.	Per Cent.
1842–1849	49	53.3	43	46.7
1850–1859	175	48.3	187	51.7
1860–1869	208	51.4	197	48.6
1870–1879	165	51.1	158	48.9
1880–1889	204	51.0	196	49.0
1890–1892	39	46.4	45	53.6
Total 1842–1892	840	50.4	826	49.6

TABLE VIII.

MORTALITY OF 333 CHILDREN AT SPECIFIED AGES, CLASSIFIED BY SEX.

Decade of Mother's Graduation.	Under 1 year.		1–5 years.		6–21 years.		Over 21 years.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
1842–1849	4	1	7	5	6	1	7	6
1850–1859	12	7	21	17	9	15	16	18
1860–1869	5	9	22	15	8	7	8	6
1870–1879	11	19	7	7	7	7	2	3
1880–1889	10	10	11	8	2	2	..	1
1890–1892	..	1	1	..	1	1	..	..
Total 1842–1892	42	47	69	52	33	33	33	34

TABLE IX.

CHILDREN OF SEMINARY GRADUATES WHO HAVE TAKEN COLLEGE DEGREES, CLASSIFIED BY SEXES.

Decade of Mother's Graduation.	Male.	Female.
1842–1849	14	3
1850–1859	62	35
1860–1869	107	58
1870–1879	60	43
1880–1889	19	17
1890–1892	0	0
Total 1842–1892	262	156

TABLE X.

AGE AT WHICH CHILDREN BEGAN SELF-SUPPORT, CLASSIFIED BY SEX.

Decade of Mother's Graduation.	Under 18 years.		18–20 years.		21–25 years.		Over 25 years.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
1842–1849	6	1	6	5	3	2	..	..
1850–1859	9	1	23	16	30	17	2	5
1860–1869	5	2	24	20	40	31	7	2
1870–1879	3	1	20	5	31	25	4	1
1880–1889	3	2	12	1	10	13	..	..
1890–1892	..	..	..	..	..	..	..	..
Total 1842–1892	26	7	85	47	114	88	13	8

TABLE XI.

NUMBER OF CHILDREN MARRIED, CLASSIFIED BY SEX.

Decade of Mother's Graduation.	Male.	Female.
1842–1849	20	19
1850–1859	77	50
1860–1869	82	49
1870–1879	32	26
1880–1889	6	4
1890–1892	0	0
Total 1842–1892	217	148

II. The College Graduates.*

A large proportion of the members of this group have not yet completed their marital and occupational life, owing to their recent graduation. The oldest graduates of the first decade are on the average not yet 44, of the second not yet 33 years old. The average age at graduation has fallen during the history of the college. The average for the first decade of those whose schedules form the material of this study is 23.5, and, for the second, 22.7 years. To a slight extent, these ages have been affected by the more advanced age of the seminary graduates who returned to take the bachelor's degree. The exact average for all graduates of the last three years as given by the office of the registrar was 21 years, 8 months, in 1908; 21 years, 10 months, in 1909; and 21 years, 8 months, in 1910.

TABLE XII.

PRESENT CONJUGAL CONDITION OF 1583 COLLEGE GRADUATES OF THE CLASSES OF 1890–1909.

Decade of Graduation.	Single.		Married.		Divorced.
	Number.	Per Cent.	Number.	Per Cent.	Number.
1890–1899	219	58.09	158	41.91	..
1900–1909	921	76.37	285	23.63	..
Total 1890–1909	1,140	72.01	443	27.98	..

* The bachelor's degree was first conferred in 1889, by virtue of the charter granted to the institution the year previous. Since only two schedules were returned by graduates of 1889, neither of which contained information incident to occupational life, the tabulation begins with the opening of the new decade.

By comparing Table XII with Table I, we see that 20.19 per cent. more of the seminary graduates (for whom practically all marriages are now contracted) have married than of the members of the first decade of college graduates, and 34.12 per cent. more than of members of the second decade who as yet have married. But the average age at marriage for the seminary graduates was 27.21, and the graduates of the class of 1909 are on the average not yet 23 years old. The youngest graduates of the first decade, are, however, several years past this average and it may be taken that close to 41.9 per cent. will ultimately marry. The class of 1910 is not included in the tables, since their schedules were filled only four months after graduation. The addition of its members would then have increased the number of single women by 167, and of the married by one.

The General Catalogue gives the following information: 1886 Bachelors, 2200 Seminary graduates, or 4086 total graduates; 1830, or 44.79 per cent., graduates (both Seminary and College) were married. The widows are included under "Married," as in Table I.

TABLE XIII.

OCCUPATIONS OF HUSBANDS OF MARRIED COLLEGE GRADUATES.

Occupations.	1890–1899.	1900–1909.	1910.	Total.
Business Men	51	106	1	158
Teachers	20	45	..	65
Lawyers	10	23	..	33
Clergymen	16	13	..	29
Engineers	4	21	..	25
Doctors	9	14	..	23
Farmers	9	6	..	15
Missionaries	5	5	..	10
Editors	3	4	..	7
Scientists	1	3	..	4
Journalists	..	3	..	3
Writers	1	2	..	3
Architects	..	2	..	2
College Presidents	2	..	..	2
Opticians	2	..	..	2
Y. M. C. A. Secretaries	2	..	..	2
Army Officer	..	1	..	1
Dentist	..	1	..	1
Engraver	1	..	..	1
Librarian	..	1	..	1
Musician	1	..	..	1
Navy Officer	..	1	..	1
Pharmacist	1	..	..	1
Social Worker	..	1	..	1
Statistician	..	1	..	1
	138	253	1	382

In 86 cases, or 55 per cent. of the 156 marriages of the classes 1890–1899, the husband was reported a college graduate; likewise, in 170 cases, or 60 per cent. of the 285 marriages of 1900–1909. In the single marriage reported for the class of 1910, the husband is a college graduate. Thus, of a total of 440 marriages the husbands are college graduates in 257, or 58 per cent., while an increased tendency to mate with college graduates is evidenced in the second decade.

Table XIII shows the occupations of husbands. Business men are by far the largest group, with 41 per cent. of the whole number. Teachers follow with 17 per cent.; clergymen, who held second place with the seminary graduates, drop to fourth with the college graduates. Lawyers, engineers, and physicians show approximately even proportions.

TABLE XIV.

NUMBERS AND PERCENTAGE OF 439 COLLEGE GRADUATES OF 1890–1909 MARRYING AT SPECIFIED AGES CLASSIFIED BY DECADE OF GRADUATION.

Age at Marriage.	Number of Women.			
	1890–1899.	1900–1909.	1890–1909.	Per Cent.
19	..	..	..	....
20	..	2	2	.5
21	..	3	3	.7
22	2	10	12	2.8
23	3	21	24	5.5
24	10	45	55	12.5
25	25	42	67	15.3
26	20	42	62	14.1
27	16	47	63	14.4
28	17	31	48	11.0
29	19	17	36	8.2
30	11	12	23	5.2
31	7	5	12	2.8
32	6	3	9	2.0
33	7	2	9	2.0
34	5	..	5	1.1
35	4	1	5	1.1
36	1	..	1	.2
37	3	..	3	.7
38	..	..	..	....
39	..	..	..	....
40	..	..	..	....
Totals	156	283	439	100
Average	28.10	26.04	26.77	....

Fifty per cent. of the graduates of 1890–1899 married before the end of their 29th year; 50 per cent. of the graduates of 1900–1909 married before the end of their 27th year; and 50 per cent. of the graduates of 1890–1909 (whole period) married before the end of their 27th year.

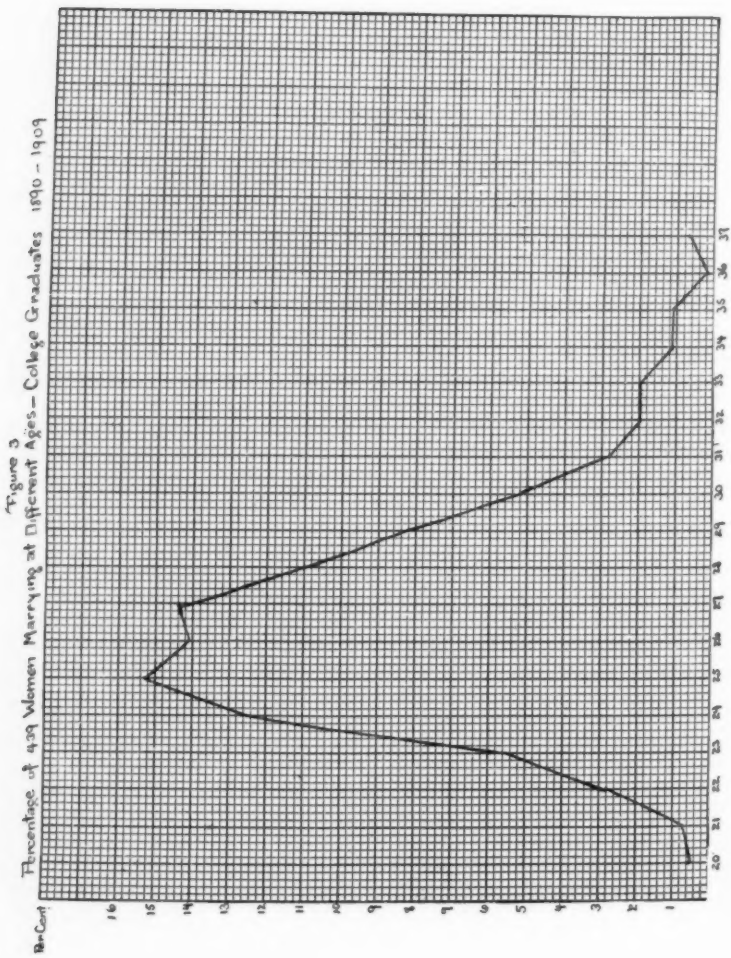
Figure 3
Percentage of 439 Women Marrying at Different Ages – College Graduates 1890 – 1909
Per Cent
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37

Table XIV shows a considerable tendency to earlier marriage in the second decade—a difference of two years. As in the case of the seminary graduates, the decade of highest average at marriage (28.1 years) is coincident with years of economic depression. Yet in the present case, the lower average is in large part, due to the fact, already dwelt upon that marriages for the later years cannot yet have been contracted. We may conclude, however, that the great majority of those who marry wait three or four years after graduation before so doing.

Doctor Smith, in the paper above referred to, finds the average age at marriage for the college group to be 26.3 years, only a fraction of a per cent. greater than the age of the Mount Holyoke graduates for the decade 1900–1909. She does not state, however, what percentage of the number were recent graduates. For the corresponding non-college group the average age at marriage is given as 24.2 and the two years' postponement is attributed to the college education.

Figure 3 is a curve showing the percentage of those marrying at specified ages, and reaches the highest point at 25 years, as did the curve for the seminary graduates (Fig. 1). There was an even greater concentration of marriages within the years 23–32 which constitute 90.89 per cent. as against 73 per cent. for the seminary group though the figures for 33 years and over, will later add somewhat to the percentage for this group, which is now only 5.24.

Again, in Table XV, we are to expect that the preponderance of children belonging to the earlier contracted marriages will later be somewhat disturbed, but it is to be noted, that with the single exception of the part decade from 1842–1849, every column of Tables IV and XV, shows for the marriages contracted at 24 years of age a larger number of children than for those contracted at any earlier age, and for those contracted at 30 years, a larger number of children than for those contracted at any later age, with the exceptions of 1842 and 1860. But the numbers of marriages contracted (Tables III and XIV) show the same points of increase and decrease with the addition of the exception in the decade of 1850 (by only one marriage) and 1880 (by only two marriages).

Figure 4

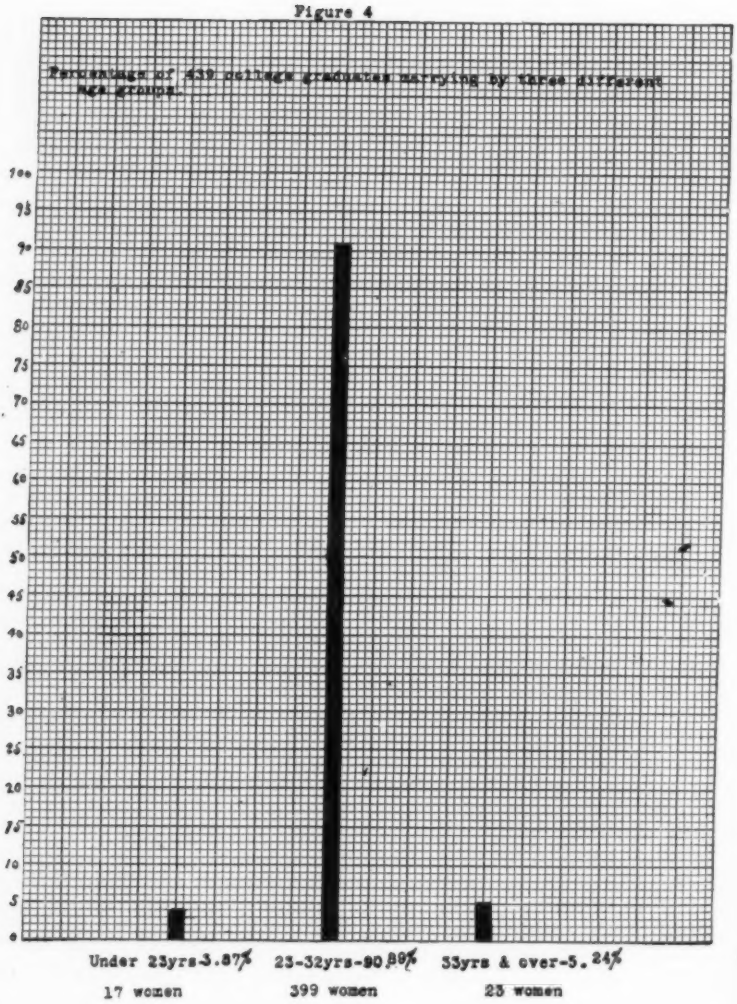
Percentages of 439 college graduates marrying by three different age groups.
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Under 23yrs-3.87%
17 women
23-32yrs-90.89%
399 women
33yrs & over-5.24%
23 women

TABLE XV.

NUMBER OF CHILDREN BORN TO 439 COLLEGE GRADUATES OF THE CLASSES OF 1890–1909, CLASSIFIED BY AGE OF MOTHERS AND THE DECADE OF THEIR GRADUATION.

Age of Mother at Marriage.	1890–1899.	1900–1909.	1890–1909.
19	..	..	..
20	..	1	1
21	..	5	5
22	5	10	15
23	3	25	28
24	23	44	67
25	60	44	104
26	54	52	106
27	34	42	76
28	23	18	41
29	40	10	50
30	11	6	17
31	4	1	5
32	8	..	8
33	5	2	7
34	8	..	8
35	9	..	9
36	..	..	..
37	1	..	1
38	..	..	..
39	..	..	..
40	..	..	..
Totals	288	260	548

TABLE XVI.

THE FECUNDITY OF 439 COLLEGE GRADUATES, CLASSIFIED BY AGE AT MARRIAGE AND BY DECADE OF GRADUATION.

Age at Marriage.	Total Number of Child-bearing Years in Married Life of Women Marrying at Specified Ages.			Average Number of Children born to each Woman.			Number of Child-bearing Years of Married Life to Each Child.		
	1890–1899.	1900–1909.	1890–1909.	1890–1899.	1900–1909.	1890–1909.	1890–1899.	1900–1909.	1890–1909.
19	..	..	..	....	....	....	....	....	....
20	..	6	6	....	.5	.5	....	6.00	6.00
21	..	12	12	....	1.66	1.66	....	2.40	2.40
22	26	29	55	2.5	1.00	1.25	5.20	2.90	3.66
23	39	84	123	1.00	1.19	1.16	13.00	3.36	4.39
24	117	153	270	2.30	.97	1.21	5.08	3.47	4.02
25	289	116	405	2.40	1.04	1.55	4.81	2.63	3.89
26	212	142	354	2.70	1.23	1.70	3.92	2.73	3.33
27	153	160	313	2.12	.89	1.20	4.50	3.80	4.11
28	149	77	226	1.35	.54	.85	6.47	4.27	5.51
29	120	33	153	2.10	.58	1.38	3.00	3.30	3.06
30	85	30	115	1.00	.50	.78	7.72	5.00	6.76
31	40	4	44	.57	.20	.41	10.00	4.00	8.80
32	34	1	35	1.33	....	.88	4.25	....	4.37
33	49	5	54	.71	1.00	.77	9.80	2.50	7.71
34	29	..	29	1.60	....	1.60	3.62	....	3.62
35	40	..	40	2.22	....	1.80	4.44	....	4.44
36	..	..	..	....	....	....	....	....	....
37	11	..	11	.33	....	.33	11.00	....	11.00
38	..	..	..	....	....	....	....	....	....
39	..	..	..	....	....	....	....	....	....
40	..	..	..	....	....	....	....	....	....
Totals	1,393	852	2,245	2.43	.92	1.25	4.83	3.28	4.10

We have therefore to examine Table XVI for the question of the relation between fecundity and age at marriage. It shows that little connection exists between the two within the limits of the ages 22 and 32.

It goes almost without saying that the striking difference between the decades in the average number of children per woman is due in part to the fact that in the second group, the marriages and the women are still young. If, however, the 439 college graduates continue to bear children, during the next five years at the rate already reached (one child for every 4.1 years of married life) then, even without regard to the possibility of children born after that time, the average number of children per woman will be 2.47, or only 0.19 less than the average for the whole seminary group in the fifty years period from 1842–1892.

The college group has some advantage, of course, in the greater fecundity of the earlier ages, yet it is not unfair to assume, on the basis of the foregoing, that the population is being increased by this group in a ratio easily comparable with that of the corresponding one of a generation ago.

The question of the increase or decrease in the number of childless marriages among college graduates is one of much interest, but we are without data for the average length of time between marriage and the birth of the first child, so cannot reckon what percentage of the present marriages will remain permanently childless. For the first decade, 24.36 per cent. are now without offspring, for the second 38.51 per cent. or 33.48 for the whole period. This is nearly twice as large as the percentage for the seminary group (17.76 per cent.). Doubtless the proportion will change by the eventual reduction of the percentage for the college group.

TABLE XVII.

CHILDLESS MARRIAGES IN A TOTAL OF 439 GRADUATES, CLASSIFIED BY DECADE OF GRADUATION AND AGE OF WOMEN AT TIME OF MARRIAGE.

Age at Marriage.	1890–1899.	1900–1909.	1890–1909.	Total Number of Marriages.
19	..	..	..	..
20	..	..	..	2
21	..	1	1	3
22	..	4	4	12
23	1	6	7	24
24	1	16	17	55
25	5	14	19	67
26	3	8	11	62
27	1	17	18	63
28	6	18	24	48
29	2	9	11	36
30	4	7	11	23
31	4	4	8	12
32	2	3	5	9
33	3	1	4	9
34	2	..	2	5
35	1	1	2	5
36	1	..	1	1
37	2	..	2	3
38	..	..	..	..
39	..	..	..	..
40	..	..	..	..
Total	38	109	147	439

TABLE XVIII.

SEX OF 548 CHILDREN BORN TO 439 COLLEGE GRADUATES.

Decade of Mother's Graduation.	Male.		Female.	
	Number.	Per Cent.	Number.	Per Cent.
1890–1899	152	52.78	136	47.22
1900–1909	136	52.31	124	47.70
Total 1890–1909	288	52.55	260	47.44

Table XVIII shows an increase of 2.15 per cent. of males born over the ratio in the children of seminary graduates (Table VII). The latter, however, showed more variation between the decades, than exists between the two groups.

We come now to a consideration of the further training of the college graduate and the character of her occupational life.

TABLE XIX.

ADDITIONAL TRAINING OF 509 COLLEGE GRADUATES.

Decade of Graduation.	Interval after College.				Where Taken.			Higher Degrees and Honors.				
	Under 1 Year.	1–2 Years.	3–5 Years.	Over 6 Years.	University.	College.	Professional School.	Master.	B.S., B.Pd. and B.D.	Ph.D.	M.D.	Fellow.
1890–1899	18	18	34	44	91	48	42	23	8	3	2	17
1900–1909	54	99	67	15	147	80	101	42	13	3	1	18
Total 1890–1909	72	117	101	59	238	128	143	65	21	6	3	35

Of the 1583 graduates (1890–1909), 509, or 32 per cent., have taken some additional training after leaving college (Table XIX). The university has in each decade received the greater number of them, but the professional schools show a relative gain in the second decade, over both the college and the university. The same decade shows a tendency to take the training after a much shorter interval after college, the majority being found in the 1–2 year groups, while the majority of the first decade are found in the group from 3–6 years and over. Of the 509 graduates, 18.7 per cent. won some higher degree, and 7 per cent. reported fellowships.

TABLE XX.

INTERVAL BETWEEN COLLEGE AND BEGINNING OF OCCUPATIONAL LIFE FOR 1,115 COLLEGE GRADUATES.

Decade of Graduation.	Under 1 Year.	2–3 Years.	4–5 Years.	Over 5 Years.
1890–1899	141	43	10	15
1900–1909	830	54	14	8
Total 1890–1909	971	97	24	23

That college alone furnishes the only preparation for the majority entering occupational life is shown by Table XX, as the larger number begin it immediately upon leaving college. In each case the 2–3 year interval forms the second largest group.

TABLE XXI.

OCCUPATIONS OF 1,443 COLLEGE GRADUATES, CLASSIFIED BY DECADE OF GRADUATION.

Occupations.	1890-1899.	1900-1909.
Teaching.		
Grades	68	228
High school	157	647
College	44	74
Normal	10	8
Private	26	33
Not given	81	76
Total	336	1,066
Total, counting none twice	289	867
Other Occupations.		
Medicine	3	1
Nursing	5	10
Journalism	14	11
Library	14	36
Business	14	28
Social work	2	14
Secretary	13	41
Y. W. C. A.	5	18
Missionary	3	16
Research	6	2
College president	1	..
Dean	3	..
Lawyer	..	1
Dentist	..	1
Other	11	14
Total not teaching	94	193
Total in occupational life	383	1,060

Table XXI exhibits the occupations engaged in at some time since graduation by 1443 college students. For many of these the occupational life is now over, but it is significant that 82 per cent. of the total have, for longer or shorter periods, entered some occupation.

Teaching absorbs the largest number in each decade: 75 per cent. in the first, and 82 per cent. in the second. Since, however, occupations other than teaching for the most part cannot be entered without further preparation, it is to be assumed that the percentage of those in other occupations in the second decade will increase when time enough has elapsed to permit them to qualify. Indeed, if the character of their additional training (see Table XIX) may be taken as indicative of the future, the first and second decades will one day change rank in the number entering occupations other than teaching.

TABLE XXII.

PRESENT INCOME-EARNING STATUS, BY CONJUGAL CONDITION, OF 1,749 COLLEGE GRADUATES.

Decade of Graduation.	Single.		Married.		Widowed.	
	Earning.	Not Earning.	Earning.	Not Earning.	Earning.	Not Earning.
1890–1899	171	47	3	152	2	2
1900–1909	791	131	5	274	1	2
Class of 1910	130	37	0	1	..	..
Total 1890–1910	1,092	215	8	427	3	4

TABLE XXIII.

AVERAGE SALARIES IN 1,159 TEACHING POSITIONS.

Grades.

Decade of Graduation.	Minimum.	Maximum.	Annual Raise.	Number Reporting.
1890–1899	$367.87	$595.54	$24.72	68
1900–1909	459.35	536.06	30.41	228

High School.

Decade of Graduation.	Minimum.	Maximum.	Annual Raise.	Number Reporting.
1890–1899	$532.76	$790.62	$40.46	157
1900–1909	537.12	678.24	53.23	647

Private Schools—Grade not Given.

Decade of Graduation.	Minimum.	Maximum.	Annual Raise.	Number Reporting.
1890–1899	$588.08	$637.60	$11.20	26
1900–1909	636.06	719.12	53.86	33

The present income-earning status of 1749 college graduates is shown in Table XXII. There are 63 per cent. earning incomes, but if we except the married members, we find 83 per cent. earning. Only 8 married members, and 3 widows earn. "Income-earning" probably means only partial self-support, in many cases, for the line of a woman's economic independence is very indefinite, even in the case of those engaged in the occupations.

TABLE XXIV.

AVERAGE SALARIES IN OCCUPATIONS OTHER THAN TEACHING.

Decade of Graduation.	Minimum.	Maximum.	Annual Raise.	Number Reporting.
1890–1899	$651.02	$1,014.45	$37.81	42
1900–1909	633.76	699.01	41.45	84

The most difficult and in some ways the most unsatisfactory matter in the whole investigation was found in connection with the important question of salary.* Great reluctance was shown in reporting the amounts, especially in the case of the higher grade positions, and much indefiniteness in the manner of reporting. An endeavor was made to ascertain in each case, the minimum and maximum salary, and the average annual increase.

As between the decades there is to be noted a tendency in the second to start in at a considerably higher figure. Longer experience is, doubtless, a factor in gaining a higher maximum for the earlier decade in the public schools, though in the private schools the decade after 1900 shows the higher salaries.

In every case the higher average annual increase is held by the later decade. This is, however, often to be accounted for by the fact that advances in salary are infrequent after a certain amount has been reached and the early decade has the greater number of years.

*The college salaries were not tabulated because of the failure in most of the cases to state what grade of teaching was done; no distinction being made between such minor positions as those of laboratory assistant and readers, instructors and professors. An average, therefore, has little significance.

The salaries for occupations other than teaching range slightly higher, and among them are to be found the highest salaries of all.

The most impressive fact brought out by this tabulation is the low average earning power of college graduates. Whatever indirect value her services may bring the community, the economic return which is hers is frequently insufficient, during her short occupational life, to pay the cost of her training. Questions naturally arise as to whether the training itself is defective from this point of view, what effect upon her working efficiency the low salary may have, and what individual and social gain might come from a redirection of her occupational activities.

SUPPLEMENTARY BLANK.

This Supplementary Blank is sent out at the suggestion of the Department of Applied Economics and Sociology, to collect data for an investigation of the effect of college training upon the social standards and activities of American women.

Such subjects as the vocations of women, the proportion of divorces among college women, the age at which college women marry and the size of their families, are subjects of frequent discussion, and it is important to have definite information along these lines.

Because of the long period of Mount Holyoke's history, the records of Mount Holyoke alumnæ will have unusual value, and it is hoped that the result of the investigation will show the influence of the higher education of women upon their efficiency in society and contribute to the maintenance and growth of educational standards in the United States.

Information given here will be regarded as *confidential*, and we ask that it be cheerfully and accurately furnished.

Graduate? No Yes Year . If non-graduate, years in seminary or college

Occupations.

Dates.	Place.	Salary.	Teaching.		Other Professions.	Business and Other Occupations.
			Grade.	Subject.		

Single.	Married.	Widowed.		Divorced.	Children.						
	Dates of each Marriage.	Date.	Self-supporting Since?		Sex of Each.	Date. Birth.	Date. Death.	College Degrees and their Dates.	Age at which Self-support Began.	Present Occupation.	Married Yes or No.
Yes or No			Yes or No	Yes or No							

MENTAL ABILITY IN RELATION TO HEAD CIRCUMFERENCE, CEPHALIC INDEX, SOCIOLOGICAL CONDITION, SEX, AGE, AND NATIONALITY.

By Arthur Mac Donald, *Author of "Man and Abnormal Man,"* * *Washington, D. C.*

In 1897, the writer conducted a study of the Washington school children, which was one of the first investigations of this kind in the United States. One of the measurements taken was circumference of head on the plane of the eyebrows, which is a measurement seldom, if ever, made on large numbers of children. Data were also gathered as to the ability of the children in different branches of study, which was the first time such an inquiry had been conducted on a large scale.

At that time the results were published in a voluminous work, not only containing other measurements, but treating of other subjects. As a consequence these results are not easy of access. The purpose of this article, therefore, is to call special attention to these and other points suggested.

As the difficulties of estimating the mental ability of pupils are well known, and as there is always doubt as to whether a teacher's judgment was correct, all possible precautions were taken. For instance, if there was the least doubt in the teacher's mind as to whether a pupil was bright or dull, the teacher was told to mark such pupil average, so that there might be as few errors as possible as to brightness and dullness.

Teachers were asked to report only on pupils whom they knew well, and while the test rested mainly on their records, yet this did not prevent them from giving weight to their opinion, where the records were inadequate. Though there are no satisfactory standards of ability, this does not in the least prevent us from saying that one pupil is bright and another dull.

* This public document (780 pages) might be obtained gratis, either through any United States Senator or Representative, or by writing directly to the Superintendent of the House or of the Senate Document Room. Also the "Superintendent of Documents," at the Government Printing Office, Washington, D. C., will send this document on receiving its price (40 cents).

The pupils were divided according to the occupation of their parents into (1) laboring and (2) non-laboring classes. The non-laboring comprise professional and mercantile people; the laboring embrace all others including skilled and unskilled laborers.

TABLE I.

MENTAL ABILITY AND CIRCUMFERENCE OF HEAD.

Nearest Age.	Bright Boys.		Dull Boys.		Average Boys.		Bright Girls.	
	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.
6.....	53	20.25	39	20.29	45	20.26	5	21.27
7.....	205	20.50	99	20.29	199	20.35	236	20.02
8.....	320	20.57	101	20.29	326	20.54	364	20.20
9.....	384	20.65	102	20.48	340	20.64	403	20.33
10.....	392	20.78	118	20.53	355	20.74	404	20.50
11.....	322	20.83	97	20.59	386	20.85	388	20.59
12.....	349	20.98	128	20.85	459	20.93	328	20.93
13.....	305	21.06	131	21.01	421	20.98	338	21.03
14.....	227	21.26	143	21.07	371	21.24	285	21.29
15.....	167	21.61	116	21.32	220	21.41	204	21.34
16.....	104	21.78	80	21.55	144	21.67	142	21.50
17.....	34	22.08	32	21.56	70	22.00	45	21.76
18.....	14	22.12	4	22.03	24	21.95	45	21.70

TABLE I.—*Continued.*

Dull Girls.		Average Girls.		Bright Boys American Parents: Laboring Classes.		Dull Boys American Parents: Laboring Classes.	
Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.
40	19.61	49	20.03	11	20.04	..	.....
41	19.72	231	19.89	58	20.42	45	20.28
68	19.92	322	20.11	112	20.50	50	20.29
62	20.30	418	20.25	119	20.65	54	20.43
62	20.23	473	20.41	141	20.71	48	20.57
86	20.36	457	20.53	100	20.72	44	20.64
82	20.48	465	20.74	112	20.93	49	20.75
113	20.77	515	20.93	88	21.03	58	20.91
101	20.93	447	21.18	57	21.15	44	20.96
112	21.38	339	21.26	39	21.50	40	21.21
55	21.24	253	21.34	21	21.93	32	21.54
60	21.40	165	21.57	..	.....	..	.....
25	21.54	109	21.58	..	.....	..	.....

In order that the measurements might be made as accurate as possible, the superintendent of the schools selected the

most careful teachers and the writer spent much time in instructing and directing them in the work. All of the head measurements except circumference, were made by the writer himself.

In Table I is given the average circumference of head (in inches) of bright, dull, and average boys and girls. As will be seen, the average circumference of head of bright boys is greater for every age (except 6) than that of the dull boys. The bright girls also show, for every age, a larger average circumference of head than the dull girls.

But we do not know whether or not this difference in head circumference between bright and dull children may not be due to racial and sociological conditions. In the last four columns of Table I these two factors are eliminated, where bright boys of American parentage and belonging to the laboring classes are compared with dull boys of similar parentage and same sociological conditions. Here, also, for every age the average head circumference of the bright boys is greater than that of the dull boys. This is the first time by actual measurements on large numbers that mental brightness has been shown to be accompanied with a larger circumference of head than mental dullness.*

TABLE II.

ABILITY AND CEPHALIC INDEX.

Divisions According to Social Classes and Ability.	Number of Individuals.	Average Age in Years and Months.		Long-headed (Dolicocephalic).	Medium-headed (Mesocephalic).	Short-headed (Brachycephalic).
		Years.	Months.	Per Cent.	Per Cent.	Per Cent.
Non-laboring classes.						
Bright boys	117	12	..	9	57	34
Bright girls	114	13	1	13	53	34
Dull boys	39	14	1	28	44	28
Dull girls	39	15	4	8	46	46
Average boys	49	12	6	12	43	45
Average girls	30	14	10	10	48	42
Laboring classes.						
Bright boys	53	12	..	8	32	60
Bright girls	62	13	2	14	60	26
Dull boys	34	12	7	6	38	56
Dull girls	34	13	9	12	44	44
Average boys	32	11	1	13	53	34
Average girls	37	13	7	11	43	46
Not socially divided.						
Bright boys	55	13	10	9	58	33
Bright girls	83	12	2	8	44	48

*It might be stated that Doctor Porter in his investigation of St. Louis school children in 1893, found a larger width of head in successful school children.

Table II gives the figures for mental ability and cephalic index. Eliminating the sociological element, 9 per cent. of the bright boys and 28 per cent. of the dull boys of the non-laboring classes are long-headed, while in the same sociological class 34 per cent. of bright and 28 per cent. of dull boys are brachycephalic. The reverse is true in case of the girls in this class; that is, 13 per cent. of the bright and 8 per cent. of the dull girls are dolicocephalic, and 34 per cent. of the bright and 46 per cent. of the dull are brachycephalic. That is to say, in boys dolicocephaly seems to indicate a higher per cent. of dullness and brachycephaly a higher per cent. of brightness, while in girls the opposite is true. With the laboring classes the same comparisons are true except in the case of the brachycephalic boys. In connection with the fact, that dull boys show a much larger per cent. of dolicocephaly than bright boys, it may be stated that colored boys as compared with white boys are much more dolicocephalic. Also dull colored boys have 40 and bright colored boys 23 per cent. of dolicocephaly (See "Man and Abnormal Man").

Comparative Ability in Studies.

The teachers were asked not only to mark each pupil bright, dull, or average in general, but to specify the studies in which each one was bright, dull, or average, so that their estimate of ability might be as complete as possible. As it is easier to determine the status of a pupil in some single branch, than in general, the results in the following table may be not only more definite, but less liable to error.

In Table III are given the numbers and percentages of ability of pupils in the main branches of study. Some of the teachers reported for "arithmetic" under head of "mathematics." These results were not consolidated, since any agreement between them would tend to confirm the general correctness of the reports.

Ability and Sex.

By analysis of the table (III), we find that boys of American parents when compared with girls of American parents are inferior to the girls in algebra, drawing, history, language,

manual labor, music, penmanship, reading and spelling, and superior to the girls in arithmetic and mathematics; that is, the boys are inferior in eight studies, superior in two and equal in four.

If we now compare the boys of American parentage, non-laboring classes, with the girls of like parentage and class, eliminating the influence of nationality and sociological conditions, we find that the girls excel the boys still more, being equal to them in arithmetic, where before they were inferior and superior in geography where they were formerly equal to them.

Comparing boys and girls of the laboring classes, American parentage, the boys gain some, for they are superior in history, where they were equal to the girls. They are equal in drawing, where they were inferior to the girls.

TABLE III.

	Mental Divisions.	Algebra.		Arithmetic.		Drawing.		Geography.		History.	
		Number.	%	Number.	%	Number.	%	Number.	%	Number.	%
Boys of American parentage	Bright...	38	36	2,170	44	498	34	387	35	306	44
	Dull.....	20	19	912	18	327	22	143	13	134	15
	Average..	48	45	1,862	38	634	44	572	52	370	41
Girls of American parentage	Bright...	90	49	1,820	37	576	35	453	36	491	41
	Dull.....	21	11	931	19	268	17	150	12	181	15
	Average..	73	40	2,186	44	789	48	641	52	519	44
Boys of American parentage (non-laboring classes)	Bright...	31	37	1,170	46	341	39	278	42	295	51
	Dull.....	15	18	477	19	192	22	69	10	60	10
	Average..	38	45	904	35	347	39	321	48	226	39
Girls of American parentage (non-laboring classes)	Bright...	61	50	966	42	358	41	288	46	344	50
	Dull.....	12	10	278	12	109	13	26	4	54	8
	Average..	48	40	1,037	46	402	46	311	50	287	42
Boys of American parentage (laboring classes)	Bright...	7	32	1,000	42	157	27	109	25	101	32
	Dull.....	5	23	435	18	135	23	74	17	74	23
	Average..	10	45	958	40	287	50	251	58	144	45
Girls of American parentage (laboring classes)	Bright...	29	46	854	32	218	28	165	27	147	29
	Dull.....	9	14	653	25	159	21	124	20	127	25
	Average..	25	40	1,149	43	387	51	330	53	232	46
Boys of foreign and mixed nationalities	Bright...	12	50	684	41	141	31	102	30	98	35
	Dull.....	1	4	311	19	111	24	51	15	58	21
	Average..	11	46	665	40	202	45	189	55	123	44
Girls of foreign and mixed nationalities	Bright...	20	27	563	34	182	33	120	30	138	30
	Dull.....	22	30	402	24	98	17	69	18	95	21
	Average..	31	43	685	42	278	50	204	52	223	49
Colored boys	Bright...	30	61	1,033	54	153	47	212	45	141	51
	Dull.....	4	8	386	20	55	17	62	13	30	11
	Average..	15	31	501	36	119	36	201	42	104	38
Colored Girls	Bright...	37	65	948	60	73	40	250	62	159	64
	Dull.....	11	19	459	29	46	25	100	25	56	22
	Average..	9	16	173	11	65	35	52	13	35	14

TABLE III.—*Continued.*

Language and English.		Manual Labor. Sewing.		Mathematics.		Music.		Penmanship.		Reading.		Science. Botany.		Spelling.	
Number.	%	Number.	%	Number.	%	Number.	%	Number.	%	Number.	%	Number.	%	Number.	%
1,322	38	661	29	155	50	337	24	449	28	1,079	43	106	44	398	33
675	19	475	21	48	16	286	29	424	27	509	21	44	12	297	24
1,493	43	1,113	50	103	34	475	47	722	45	900	36	167	44	526	43
1,705	46	860	40	141	34	416	40	658	40	1,287	54	197	45	630	48
392	10	198	9	84	20	101	10	223	13	265	11	63	15	181	14
1,618	44	1.117	51	188	46	515	50	767	47	846	35	175	40	488	38
805	42	371	31	116	56	156	25	254	30	595	48	114	48	252	35
316	17	235	19	23	11	187	29	227	27	204	17	22	9	166	23
787	41	600	50	69	33	294	46	370	43	427	35	100	43	295	42
1,002	53	488	45	97	36	265	45	350	45	684	64	128	50	372	58
89	5	52	5	50	18	47	8	89	11	47	4	36	14	55	8
791	42	545	50	123	46	275	47	358	44	338	32	90	36	219	34
527	33	290	28	39	40	81	23	195	26	484	38	52	37	146	29
359	23	240	23	25	25	99	27	197	27	305	24	22	16	131	26
706	44	513	49	34	35	181	50	352	47	473	38	67	47	231	45
703	38	372	34	44	31	151	34	299	35	603	45	69	38	258	40
303	17	146	13	34	24	54	12	134	16	218	17	27	15	126	19
827	45	572	53	65	45	240	54	409	49	508	38	85	47	269	41
392	32	221	27	45	43	74	25	123	26	316	40	51	37	121	31
260	22	183	23	16	15	71	25	128	28	162	21	20	15	109	27
561	46	400	50	44	42	144	50	216	46	306	39	65	48	165	42
476	38	263	36	47	34	148	42	228	44	373	46	69	38	192	41
217	18	79	11	35	25	34	10	59	13	119	15	28	16	76	16
548	44	379	53	58	41	166	48	221	43	375	39	84	46	197	43
448	42	.....	..	28	44	85	36	346	45	795	49	7	25	348	41
180	17	.....	..	20	31	45	19	135	17	361	22	12	43	189	23
429	41	.....	..	16	25	106	45	299	38	478	29	9	32	300	36
568	63	.....	..	....	..	82	49	367	54	928	17	17	31	416	59
201	22	.....	..	....	..	23	14	134	19	294	21	6	11	164	23
140	15	.....	..	....	..	62	37	184	27	157	62	32	58	128	18

Comparing boys and girls of mixed nationalities, the boys become superior in algebra, where they were inferior. Whatever sociological or racial division is made, the girls generally excel the boys in mental ability, as estimated by the teachers. But at the same time, the girls show higher percentage of average ability and therefore less variability. Thus boys are inferior in average ability to girls in nine studies, equal in one and superior in four. From the evolutionary point of view, the boys might be considered superior to the girls, since the superior species varies the most.

It is true that girls are usually more industrious than boys and therefore more successful in school. It is also true that those having the highest marks are usually the brightest. But there are pupils who gain high marks by faithfulness rather than by brightness. In such instances, the teacher usually marked them average.

Ability and Sociological Conditions.

If we compare boys of American parents and non-laboring class with boys of like parentage but of laboring class, the former are equal in five studies, superior in nine and inferior in none to the latter. Sociological conditions affect the girls still more, since those of American parentage, non-laboring class, excel the girls of like parentage, but of laboring class, in all branches of study. The children of the laboring classes excel those of the non-laboring classes in average ability or mediocrity. Comparing boys of the non-laboring class with boys of the laboring class, the former are inferior to the latter in average ability, in eleven studies, superior in one and equal in two. The girls of the non-laboring class are inferior in average ability to the girls of the laboring class in ten studies, superior in two and equal in one study.

This mental superiority of the non-laboring, or professional and mercantile classes is confirmed by other results gained from the study of the Washington schools. It was shown that the bright are taller and heavier than the dull thus verifying studies in other cities, and also that the children of the professional and mercantile classes are taller and heavier than the children of the laboring classes.

Ability and Nationality.

From examination of Table III, it will be seen that boys of foreign and mixed nationalities are inferior to the boys of American parentage in five studies, equal in eight and superior in one, and that the girls of foreign and mixed nationality are inferior to the girls of American parentage in nine studies, equal in five and superior in none. Thus the influence of foreign and mixed nationality seems unfavorable to the development of ability.

Boys of foreign and mixed nationalities are inferior in average ability in one study; superior in eleven studies and equal in two studies to boys of American parentage. So, also, girls of foreign and mixed nationality are inferior in average ability in four studies, superior in eight and equal in two studies to girls of American parentage. In other words, children of foreign and mixed nationalities excel children of American parentage in average ability or mediocrity.

TABLE IV.

BOYS—AMERICAN PARENTAGE.

Nearest Age.	Mental Divisions.	Algebra.	Arithmetic.	Drawing.	Geography.	History.	Language and English.	Manual Labor. Sewing.	Music.	Penmanship.	Reading.	Science. Botany.	Spelling.
Years.													
7	Bright	..	48	27	..	..	45	30	25	22	48	56	46
	Dull	..	16	35	..	..	18	26	36	38	25	6	12
	Average	..	36	38	..	..	37	44	40	40	27	38	42
8	Bright	..	47	31	69	..	39	31	35	33	50	51	37
	Dull	..	14	15	8	..	15	23	17	25	17	15	20
	Average	..	39	54	23	..	46	46	48	42	33	34	43
9	Bright	..	48	33	..	..	48	28	37	34	49	53	45
	Dull	..	15	21	..	..	14	20	18	20	13	9	12
	Average	..	37	46	..	..	38	52	45	46	38	38	43
10	Bright	..	51	25	54	48	29	26	27	27	51	37	37
	Dull	..	11	28	5	..	15	19	23	27	21	12	24
	Average	..	38	47	41	..	37	52	51	46	28	51	39
11	Bright	..	45	31	48	56	41	27	23	29	46	35	32
	Dull	..	17	19	10	11	16	26	22	23	20	13	21
	Average	..	38	50	42	33	43	47	55	48	34	52	47
12	Bright	..	44	35	36	54	37	28	20	23	39	47	30
	Dull	..	17	24	11	11	17	20	33	29	22	11	25
	Average	..	39	41	53	35	46	52	47	48	39	42	45
13	Bright	..	42	37	29	45	32	22	21	29	29	44	26
	Dull	..	20	16	12	8	25	23	33	27	21	17	24
	Average	..	38	47	59	47	43	55	46	44	50	39	50
14	Bright	42	38	35	27	41	29	27	7	22	22	25	26
	Dull	11	24	26	17	18	24	21	44	31	22	12	33
	Average	47	38	30	56	41	47	52	49	47	56	63	41
15	Bright	43	29	51	19	42	29	40	20	27	23	30	19
	Dull	18	42	23	24	17	29	15	42	27	42	10	48
	Average	39	29	26	57	41	42	45	38	46	35	60	33
16	Bright	35	24	52	19	28	27	41	11	27	10	..	29
	Dull	24	32	25	26	30	28	17	47	22	48	..	33
	Average	41	44	23	55	42	45	42	42	51	42	..	38
17	Bright	11	24	43	14	26	12	43	..	..	..	..	60
	Dull	22	14	14	14	18	24	14	..	..	..	..	20
	Average	67	62	43	72	56	64	43	..	..	..	..	20

Age and Ability.

In Table IV are given the percentages of ability in different studies computed on number reported.

From this table it will be seen that as boys increase in age, the percentage of brightness decreases in all the studies, except drawing, manual labor and penmanship; that is, in the more mechanical studies. On the other hand, dullness increases with age in boys in all the studies, except drawing, manual labor, penmanship, music and science. These propositions are generally true of the girls as shown by a similar table, published in "Man and Abnormal Man."

Also as age increases the percentage of average ability or mediocrity increases in different studies, with the exception of spelling.

TWO METHODS OF ESTIMATING THE GROWTH OF CRIMINALITY IN THE UNITED STATES.

By Louis Newton Robinson, *Professor of Economics, Swarthmore College.*

My attention was drawn some time ago to a method* which Roland P. Falkner, in one of his excellent articles on criminal statistics, works out from the census figures for estimating the number of people who were committed to prison during a given year. It must be remembered that prior to the year 1904, the census concerned itself, with some unimportant exceptions, to the number of prisoners found in confinement on a certain day of the year. As Dr. Falkner pointed out, no real indication of the growth of criminality could be obtained from these figures. If, however, the number of those who were committed during the various census years were known, some important deductions might be made from the figures. On account of certain rather obvious defects in the method, Dr. Falkner put no great emphasis on the conclusion which he was able to draw from a comparison of the commitments of two succeeding census years. His work, however, was extremely valuable since it threw much light on the nature of the federal criminal statistics which have been grossly misunderstood.

It has seemed to me, on thinking it over, that it was possible to devise a method for estimating the number of prisoners committed to prison during a census year which would be superior to Dr. Falkner's method in so far that it would allow for an increase of population—a thing which Dr. Falkner's method did not do. And secondly, it seemed possible to construct, with the aid of data which Dr. Falkner did not have at hand at the time he wrote, an entirely new method of judging the increase or decrease of criminality during the past few years.

Since a study of Dr. Falkner's method led to my own solution of the difficulty, and since his work lays bare the mean-

*Crime and the Census by Roland P. Falkner, in Annals of the American Academy, 1897, Vol. IX, pp. 42–69.

ing of the federal criminal statistics, I can do no better than begin with a summary of his scheme.

By a simple illustration he shows that the number of prisoners found in prison on a certain day of the year may bear no relation to the number of crimes committed during that year. This is his illustration:

"It is clear that the number of prisoners at any time depends not only upon the number who have been sent to prison, but also upon the length of the sentences which have been imposed upon them. This is seen very clearly by an extreme case. If in the town A, a man is sent to prison every day with a sentence of one year's imprisonment, the prison will, at the end of the year, contain 365 prisoners. If now, in town B, a prisoner is received at the prison daily, with but the short sentence of a single day, there will be, at the end of the year, one prisoner. The number of offences has been the same, yet the population of the two prisons gives no clue to this fact." *

He then proceeds to work out his method from a hypothetical case, made up of data similar to those which could be had from the census volumes.

His hypothetical case is as follows: Suppose that in one year ten prisoners were sent to prison, each with a sentence of one year. Suppose, also, that in the same year ten prisoners were sent to prison, each with a sentence of six months. At the end of the year, the number of those remaining in prison would be all of those with the one year sentence and half of those with the six-month sentence, *viz.*, fifteen.

Thus:

	Sent to Prison Annually.	Sentence.	Remaining in Prison.
Class A	10	1 year	10
Class B	10	6 months	5
	20		15

From this, he concludes that if one has the last two columns given, one can obtain the first column, or the number of each class sent to prison annually. The problem is simple.

*P. 52.

Divide the number of each class found in prison by the length of their respective sentence, and we have

$$10 \div 1 = 10 \text{ Class A}$$
$$5 \div .5 = 10 \text{ Class B}$$

The defect of this scheme is, of course, that it depends for its validity on conditions which are somewhat improbable. Dr. Falkner recognizes this, for he says:

"Of course such a calculation proceeds upon the assumption that the total number of prisoners does not essentially vary and that men are sentenced to prison for each term at a given yearly rate. For long sentences especially, such a supposition is manifestly incorrect. As the population grows, the number of prisoners grows with it, and may indeed grow in excess of it. The number received at each rate of sentence is constantly growing. We know no method by which allowance can be made for such an increase."*

I propose to show now that an allowance for this increase in commitments, occasioned by the gradual increase in population, can be made.

Assume that on June 1, 1870, the population of a given country was 10,000,000 which increased by arithmetical progression until on June 1, 1890, it stood at 20,000,000. Imagine, also, that in the year just prior to June 1, 1871, one hundred and five people had been committed to prison, each with a sentence of twenty years. Now let the *ratio* of yearly commitments to population remain the same throughout the period, *i. e.*, one commitment to each 100,000 of population.

The number of those with a sentence of twenty years who would be found in the prisons of this country on June 1, 1890, would evidently be the sum of all who had been committed during this period, namely, 3050. This figure corresponds exactly to the data yielded by the census volumes of the United States.

*Pp. 55–56.

Year.	Population.	No. of prisoners with a 20-year sentence committed during preceding year.
June 1, 1870.	10,000,000	0
June 1, 1871.	10,500,000	105
June 1, 1872.	11,000,000	110
June 1, 1873.	11,500,000	115
June 1, 1874.	12,000,000	120
June 1, 1875.	12,500,000	125
June 1, 1876.	13,000,000	130
June 1, 1877.	13,500,000	135
June 1, 1878.	14,000,000	140
June 1, 1879.	14,500,000	145
June 1, 1880.	15,000,000	150
June 1, 1881.	15,500,000	155
June 1, 1882.	16,000,000	160
June 1, 1883.	16,500,000	165
June 1, 1884.	17,000,000	170
June 1, 1885.	17,500,000	175
June 1, 1886.	18,000,000	180
June 1, 1887.	18,500,000	185
June 1, 1888.	19,000,000	190
June 1, 1889.	19,500,000	195
June 1, 1890.	20,000,000	200
		3050

By referring to the table, it will be seen that, as the population increased in arithmetical progression from 1870 to 1890, and as the prison commitments bore a constant ratio to this population, the prison commitments increased also in arithmetical progression. This means that the number 3050 is the sum of an arithmetical progression whose number of terms is twenty and whose common difference is five.

Now the problem is simply this: Given the number of those found in prison on June 1, 1890, who had received a twenty-year sentence, is it possible without having any further facts regarding the commitments but knowing the population of the country in 1870 and 1890, to recreate the column of figures of which 3050 is the sum. If it is, then some improvement

has been made in Dr. Falkner's method, since allowance for the increase in population is thereby made.

Here is an equation in arithmetical progression:

$$S = \frac{n}{2} [2a + (n-1)\, d]$$

If now any three of the letters are given, the fourth may easily be found. Which are given in the problem set?

$$S = 3050$$
$$n = 20$$

But a is not given, nor is d; and to solve the equation one of these letters must be had. However, if d can be stated in terms of a there is only one unknown letter in the equation and it can be solved.

In the table, it can be observed that the ratio of the difference between the population of 1872 and 1871 to the population of 1871 is as 1 is to 21; also that the ratio of the difference between the commitments of 1872 and of 1871 to the number of commitments in 1871 is as 1 is to 21. In short, the per cent. of increase in commitments is always the same as the per cent. of increase in population of the corresponding year. Since d can be stated as a certain per cent. of a, and as it is possible to determine what this per cent. is by reference to the population figures, the equation can be stated with only one unknown quantity in it, thus:

$$S = \frac{n}{2} [2a + (n-1)\% \, a]$$

To determine what per cent. of a it is, one can proceed as follows:

Year.	Population.
1890	20,000,000
1870	10,000,000
20	10,000,000

$10{,}000{,}000 \div 20 = 500{,}000$

Then, assuming as this method does, that the population increased in arithmetical progression,* the population in 1871

* If the population increased by geometrical progression, my method would, of course, be based on the rules of geometrical progression.

would be 10,500,000, and in 1872 it would be 11,000,000. The ratio of the increase in population between the years 1871 and 1872 to the population of 1871 is 1 to 21. Recalling the fact that the ratio of the increase in commitments between the years 1871 and 1872 to the commitments of 1871 must be the same, it is possible by substitution to derive the following equation from the preceding one, thus:

$$S = \frac{n}{2}[2a + (n-1)\frac{1}{21}a]$$

or

$$3050 = \frac{20}{2}[2a + (20-1)\frac{1}{21}a]$$

$$= 10\,(2a + \frac{19}{21}a)$$

$$= 20\,a + \frac{190}{21}a$$

$$= 29\frac{1}{21}a$$

$$105 = a$$

$$\text{Since } d = \frac{1}{21}a$$

$$d = 5$$

The problem has been solved, since it is possible with the aid of *a* and *d* to find any numbers in the column of figures whose sum is denoted in the table by 3050.

An application of the two methods to a concrete problem will serve, perhaps, to emphasize the difference between this new method and that of Dr. Falkner.

The number of prisoners with a sentence of twenty years or more reported in prisons on June 1, 1890, was 1697. Following the Falkner method: $1697 \div 20 = 84.85$ is the estimated number of those who were committed during the year just preceding June 1, 1890.

My scheme is as follows:

Year.	Population.
1890	62,947,714
1870	38,558,371
	20) 24,389,343
	1,219,467.15

Year.	Population.
1870	38,558,371
1871	39,777,838
1872	40,997,305

$$40{,}997{,}305 - 39{,}777{,}838 = 1{,}219{,}467$$
$$1{,}219{,}467 \div 39{,}777{,}838 = .03065$$

By substitution:

$$S = 1{,}697$$
$$n = 20$$
$$d = .03065a$$

$$\therefore\ 1{,}697 = \tfrac{20}{2}[2a + (20-1)\ .03065a]$$
$$= 10[2a + (19)\ .03065a]$$
$$= 10(2a + .58235a)$$
$$= 10(2.58535a)$$
$$= 25.8235a$$
$$65.71 = a$$

$$\therefore\ d = .03065 \times 65.71 = 2.014$$
$$1 = a + (n-1)d$$
$$= 65.71 + 19 \times 2.014$$
$$= 65.71 + 38.26$$
$$= 103.97$$

103.97 is, then, the number, estimated by my method, of those having a sentence of twenty years, who were committed to the prisons during the year just preceding June 1, 1890. The following table will show how the 1697 prisoners are distributed back through the preceding twenty years by both methods.

Since my method makes allowance for the increase in population, it seems more reasonable to suppose that 103.966 rather than 84.85 was the number of those having a sentence of twenty years who were committed to prison during the year just preceding June 1, 1890. This, then, constitutes the first of the two methods which I have set out to present. It makes possible a comparison, rough it is true, but useful, perhaps, of the commitments of one census year with those of another.

Year.	Dr. Falkner's Method.	New Method.
1871	84.85	65.71
1872	84.85	67.724
1873	84.85	69.738
1874	84.85	71.752
1875	84.85	73.766
1876	84.85	75.780
1877	84.85	77.794
1878	84.85	79.808
1879	84.85	81.812
1880	84.85	83.826
1881	84.85	85.840
1882	84.85	87.854
1883	84.85	89.868
1884	84.85	91.882
1885	84.85	93.896
1886	84.85	95.910
1887	84.85	97.924
1888	84.85	99.938
1889	84.85	101.952
1890	84.85	103.966
Total	1697.00	1697.000

After the census of 1890, fourteen years passed before a new enumeration of prisoners took place. Thanks to Dr. Falkner himself, the scope of its inquiry was broader than that of the preceding one. Not only was the number of those found in prison on a certain day of the year recorded, but also the number of those who had been committed during the year.

The report containing the results of this investigation includes, therefore, two sets of data: (a) the number of prisoners found in prison June 30, 1904, and (b) the number of prisoners committed to penal institutions during the year 1904.

Do these two kinds of information offer any additional basis for a statistical calculation of the increase or decrease of criminality in the United States? It seems to me that they do.

In thinking over the question of criminality in the United States, it is possible to suppose some five different conditions of affairs, thus:

1. It is increasing exactly in proportion to the population.
2. It is increasing faster than the population.
3. It is increasing slower than the population.
4. The total amount is decreasing, regardless of the increase in population.
5. It is increasing or decreasing by leaps and bounds, neither increasing gradually nor decreasing gradually, but changing back and forth with great rapidity from year to year.

These five forms seem to include all possible conceptions of what the actuality may be. Considering them in reverse order No. 5 presupposes a state of affairs which all statistical studies show to be impossible, in view of the great stability of the social mass as a whole, where abrupt changes are not found.

No. 4 seems also incredible. Not even the most optimistic student of social affairs thinks this to be possible.

Nos. 3, 2, and 1 all seem to be possible conceptions of the real situation.

If one looks carefully at conceptions 1, 2, and 3, he will see that No. 2 lies on one side of No. 1, and that No. 3 lies on the other side of No. 1. Hence it is that, if one can secure a set of figures which represent condition No. 1, and has given to him another set which might represent either condition No. 1, 2 or 3, he can say at once whether this second set portrays condition No. 1, 2 or 3.

It has been generally understood that during the last part of the nineteenth century the population of the United States has been increasing in arithmetical progression. Now if it has, and if criminality has been increasing in exact proportion to population, then criminality also has been increasing in arithmetical progression. This has already been shown above to be true. Therefore, if condition No. 1 represents the situation faithfully, the number in each group of prisoners classified by length of sentence is the sum of an arithmetical progression whose number of terms is represented by the length of sentence, and whose last term can be found by the method already discussed. Here, then, is the second method which I propose. It is possible to name with a fair degree of exactness the number of people, say with a twenty-year sentence, who

would have been committed during the year if criminality had been increasing in exact proportion to population. And since this is possible and since the number of those who actually were committed with a twenty-year sentence is given, one can say which of the three conceptions is the true one.

In applying the second method to a concrete case, a slight, though not serious, complication arises from the fact that the number of those committed is given for the calendar year 1904 and not for the year preceding June 30, 1904, this being the date on which those in prison were enumerated.

On page 97 of the report for 1904, it is stated that 1405 prisoners, each with a sentence of twenty years, were found in prison on June 30, 1904; also on page 129 that the number of such who had been committed during the calendar year 1904 was 209.

To make all possible allowance for good behavior, pardons and deaths, the 1405 prisoners may be considered as the toll of fifteen instead of twenty years.

To proceed:

Population.	Year.
75,994,575	1900
62,947,714	1890
13,046,861	10

$13{,}046{,}861 \div 120 = 108{,}724$ or the monthly difference.

Population.	Year.	Month.
61,648,028	1889	June 1
61,751,752	1889	July 1 *
61,860,476	1889	Aug. 1

$61{,}860{,}476 - 61{,}751{,}752 = 108.724$

$108{,}724 \div 61{,}751{,}752 = .0017609$

$$S = \frac{n}{2}[2a + (n - 1)\,d]$$

$S = 1405$

$n = 180$(*i. e.*, 15 yrs. $\times$ 12 mo.)

$d = .0017609a$

*To avoid undue mathematical process, I have treated July 1 as the equivalent of June 30, in all that follows.

By substitution

$$1405 = \frac{180}{2}[2a + (180-1).0017609a]$$
$$= 90\ (2a + .3152011a)$$
$$= 90\ (2.3152011a)$$
$$= 208.368099a$$
$$6.742 = a$$
$$d = .0017609 \times 6.742$$
$$= .0118719$$
$$1 = a + (n-1)d$$
$$= 6.741 + (179 \times .0118719)$$
$$= 8.866 \text{ or the number that would}$$

have been committed during the month preceding July 1, 1904, if criminality had increased in exact proportion to population.

February	1,	1904	8.8070
March	1,	1904	8.8188
April	1,	1904	8.8306
May	1,	1904	8.8424
June	1,	1904	8.8542
July	*1,*	*1904*	*8.866*
August	1,	1904	8.8778
September	1,	1904	8.8896
October	1,	1904	8.9014
November	1,	1904	8.9132
December	1,	1904	8.9250
January	1,	1905	8.9368
Year		1904	106.4628

If, then, criminality had increased in proportion to population, there would have been committed to prison during the calendar year 1904, 106 people. But the report states that during this year 209 were committed. The difference between the two numbers is so great, and since I made ample allowance at the beginning for good behavior, pardons and deaths, I feel that the only conclusion to be made is that crimes for which a twenty-year sentence would be given have increased faster than the population.

The method is, of course, applicable to all groups of crimes as differentiated by the length of sentence.

FISHER'S *THE PURCHASING POWER OF MONEY.**

BY WARREN M. PERSONS, *Dartmouth College.*

The Purchasing Power of Money is a notable achievement. In this work, Professor Irving Fisher defines and elucidates the concepts at the basis of money theory in a particularly clear and interesting manner; he builds up and states the equation of exchange, $MV+M'V'=PT$,† so that there can be neither misconception as to its meaning, nor, as it seems to the reviewer, doubt as to its truth; he justifies the "quantity theory" by showing that prices are the dependent variables, that changes in the quantity of money in circulation, M, cause proportionate changes in the volume of bank deposits, M', and that the other items in the equation of exchange, *i. e.*, the velocities of circulation of money and checks, V and V', and the volume of trade, T, are independent variables; he breaks new ground in his thorough discussion of the measurement of the velocity of circulation of money and checks; he gives an excellent summary of the literature on index numbers together with a mathematical treatment of index numbers; he makes careful estimates of the right and left-hand sides of the equation $\frac{MV+M'V'}{T}=P$ for the years 1896–1910, inclusive, and finds a striking agreement of the values; he analyzes the causes of price change during the period in question and concludes "that the growth of money was the largest factor" in raising prices (p. 311); finally, he discusses Gresham's law, bimetallism, the history of prices, and the problem of making purchasing power more stable.

The fundamental concepts which Professor Fisher defines in *The Purchasing Power of Money* were previously defined in

* *The Purchasing Power of Money. Its Determination and Relation to Credit, Interest and Crisis.* By Irving Fisher, assisted by Harry G. Brown. New York: The Macmillan Co., 1911, pp. xxii, 505, $3.00 net.

† M = money in circulation.
V = velocity of circulation of money.
M' = bank deposits subject to check (deposit currency).
V' = velocity of circulation of deposit currency.
P = general price level.
T = volume of trade.

his *Nature of Capital and Income.* For instance, the *value* of any item of wealth is defined to be "its price multiplied by its quantity" (p. 3). Critics have questioned, and, probably, will question the usefulness or legitimacy of this and other definitions.* However, Professor Fisher's argument in the present case is not invalidated by the nature of the fundamental concepts which he uses. For example, consider the following sentence from *The Purchasing Power of Money* (p. 100) in connection with the definition of value above quoted: "Wherever the estimated cost of producing a dollar of gold is less than *the existing value of* a dollar in gold, it will normally be produced." The words which the reviewer has placed in italics are, indeed, redundant if we hold Professor Fisher to his definition of value; but the statement which he makes is not thereby invalidated.

The algebraic statement of the equation of exchange is, as Professor Fisher says, "a good safeguard against loose reasoning" (p. 24). That it clarifies the points at issue between the opponents and supporters of the quantity theory was shown in the discussion on "Money and Prices" in the last (December, 1910) annual meeting of the American Economic Association. The opponents of the quantity theory accepted the equation of exchange which Professor Fisher presented as a "mathematical identity" and as "a statement of the problem of price levels." † The points at issue between the supporters and the opponents of the quantity theory in the discussion referred to reduced themselves to the question, Is the variation in the price level, P, the cause or the effect of the variation of the amount of money in circulation, M, the amount of deposit currency, $M,'$ and their velocities, V and V'? ‡ The definition of the points at issue and the greater agreement

* For instance, A. A. Young has questioned the legitimacy of imputing a value to a whole stock of goods on the basis of the prices paid for the thin rivulet of goods which trickles through the market. (See "Some Limitations of the Value Concept" in the *Quarterly Journal of Economics*, May, 1911.)

† *Bulletin of the American Economic Association*, April, 1911, remarks by R. R. Hess and J. L. Laughlin, pp. 66, 67.

‡ Professor H. L. Moore apparently holds that this question is impossible of answer. In his recently published *Laws of Wages*, p. 2, he says: "Economic events are not arrayed in linear connection, the one following the other in direct series, as was frequently assumed by the classical economist. It was an idle controversy that Malthus and Ricardo conducted upon the question whether the abundance of food increases the population or the multitude of consumers increases the supply of food. Social phenomena are interrelated, are mutually dependent. . . . "

evidenced regarding the theory of prices * are undoubtedly to be ascribed to the statement of the equation of exchange in mathematical terms.

One of the important steps in Professor Fisher's argument to show that P is the "puppet" of the other items appearing in the equation is to demonstrate that the deposit currency, M', bears a more or less definite ratio to the money in circulation, M. Professor Laughlin holds that Professor Fisher is in error "in supposing that a man's deposit account at any time varies with the amount of money in his possession."† *The Purchasing Power of Money* contains no supposition that variations in a man's deposit account are caused by similar variations in his pocket money. Professor Fisher bases his contention "that the quantity of circulating credit, M', tends to hold a definite relation to M, the quantity of money in circulation," upon two facts, *i. e.*, first, "that bank reserves are kept in a more or less definite ratio to bank deposits" because experience has shown that a certain percentage is necessary to enable a bank to pay its debts *on demand* and, second, "that individuals, firms, and corporations preserve more or less definite ratios between their cash transactions and their check transactions, and also between their money and deposit balances" (p. 50). In a later chapter (p. 55) he shows that the relation between M and M' is not a rigid one. For instance, during a transition period in which M is increasing "M' increases still faster, thus disturbing the normal ratio between these two forms of currency" (p. 61). The rising prices, Professor Fisher argues, which must necessarily result from an increase of M, if the equation of exchange is true, will stimulate trade, P, by the temporarily easy terms for loans (p. 61) and will accelerate the circulation of money and deposit currency, V and V' (p. 63). The entire argument is convincing. However, it is not clear just what amount of economic disturbance is necessary to make a "transition period." Are we always in the midst of one?

Professor Fisher gives an interesting discussion of the indirect influences which operate upon prices through the five

* *Bulletin of the American Economic Association*, April, 1911, remarks by J. L. Laughlin, p. 28, and J. F. Johnson, p. 59.

† *Ibid.*, p. 68.

items of the equation of exchange. Among such indirect influences are the division of labor, the accumulation of capital, the extent and variety of human wants, the character of the monetary and banking systems, and business confidence, all of which influence prices through their effect on a volume of trade, T. Various causes, such as the use of checks, the system of payments used by the community, and density of population affect prices through the velocities of exchange, V and V'. The system of banking and the extent of utilization of that system and the use of charge accounts affect prices through the volume of deposits, M'. The chief influences operating upon prices through the money in circulation are: the exportation and importation of money, the melting or minting of money, the production and consumption of money metals and the monetary and banking systems. In regard to the tariff Professor Fisher concludes, "The tariff wall is a sort of dam, causing an elevation in the prices of the goods impounded behind it. . . . It furnishes a temporary stimulus, not only to protected industries, but to trade in general, which is really simply the stimulus of money inflation" (pp. 94, 95).

The general conclusion to be drawn from the argument in *The Purchasing Power of Money* is succinctly stated by Professor Fisher as follows: "The quantity theory is true in the sense that one of *the normal effects of an increase in the quantity of money is an exactly proportional increase in the general level of prices.* To deny this conclusion, requires a denial of one or more of the following premises upon which it rests:

(1) The equation of exchange, $MV+M'V'=\Sigma pQ$.

(2) An increase of M normally causes a proportional increase of M'.

(3) An increase of M does not normally affect V, V' or the $Q's$" (pp. 157–158).

If we accept the equation of exchange, $MV+M'V'=PT$, as being true—as was done by the opponents of the quantity theory in the discussion on "Money and Prices"—and if we accept Professor Fisher's contention that "*the price level is normally the one absolutely passive element in the equation of exchange*" (p. 172)—which is contested by the opponents of

the quantity theory—then we are compelled to accept a further conclusion stated by Professor Fisher. It is, that the causation of the *price level* is entirely distinct from the causation of the *price of any individual commodity* (p. 175 *et seq.*). It is best to use Professor Fisher's own words in stating his argument: "The legitimacy of separating the study of price level from that of prices will be clearly recognized, when it is seen that individual prices cannot be fully determined by supply and demand, money cost of production, etc., without surreptitiously introducing the price level itself (p. 175). . . . The significance of a dollar lies in what it will buy; and the equivalence between sugar and dollars is at bottom an equivalence between sugar and *what dollars will buy.* A change in the amount of what dollars will buy is as important as a change in the amount of sugar. The price of sugar depends partly on sugar and partly on dollars,—that is, on what dollars will buy —that is, on the price level. Therefore, beneath the price of sugar in particular there lies, as one of the bases of that particular price, the general level of prices (p. 177). . . . The reactionary effect of the price of one commodity on the prices of other commodities must not be lost sight of " (p. 179).

Professor Kemmerer, who accepts the quantity theory, and Professor Laughlin, who rejects it, both maintain that the distinction drawn by Professor Fisher between the prices of individual commodities and the general level of prices is untenable. The former "can conceive of no such distinction between the general price level and individual prices." * The latter says that Professor Fisher "wrongly works from a general level of prices to particular prices; while I hold that particular prices, or actual quotations, are the bases from which all averages, or price levels, are always and inevitably computed. Moreover, in his [Professor Fisher's] diagrams, the level of prices he used was the one computed from individual quotations. Hence, his whole reasoning on the conformity of the statistics to the terms of his equation is vitiated." † It is true that Professor Fisher computed P as an average of individual prices, based mainly upon the Bureau of Labor

* *Bulletin of the American Economic Association*, April, 1911, p. 53.
† *Ibid.*, p. 69.

index numbers of wholesale prices. But P was also computed from the function $\frac{MV+M'V'}{T}$ without use of the prices of individual commodities. The two sets of values thus obtained for P were compared as a "statistical verification" of the equation of exchange. Professor Fisher does not argue that the relative price level does not show itself in the prices of individual commodities but quite the contrary. The reviewer understands Professor Fisher's conception to be as follows: There are two streams, one of money and money substitutes, the other of commodities, which are equated in the market. On the one hand, the stream of money and its substitutes is only slightly flexible, since a given community has fixed financial habits and a certain banking development. On the other hand, the stream of commodities passing from sellers to buyers is determined by other than money influences. It is the equating of these two relatively inflexible streams that determines the price level. Hence, "the price level is not determined by individual prices, but, on the contrary, any individual price presupposes a price level" (p. 180). *

Professor Fisher's discussion of "The Best Index Numbers of Purchasing Power" (Chapter X and Appendix) is both lucid and comprehensive. This portion of *The Purchasing Power of Money* together with the "Statistical Verification" (Chapters XI and XII) are, perhaps, the most interesting parts of the book to statisticians. The relegation of the more technical and mathematical parts of the discussion to the Appendix makes the matter available to all classes of readers. The problem considered is to get the best forms of index num-

*In regard to the point at issue between Professors Laughlin and Kemmerer and himself, Professor Fisher states in a letter to the reviewer: "There seems to be in the mind of Laughlin, and perhaps of Kemmerer, a confusion between two senses of the word 'determination.' Of course it is true that the best statistical determination of the price level is to be obtained directly from the individual prices, but this does not mean that the price level has been *causally* determined by the individual prices. The determination of the price level and the determination of our knowledge of what the price level is are, of course, totally distinct, just as the determination of a level of the sea and the determination of our knowledge of what it is. We would apply the word 'determination' in each case, though the meanings are totally distinct. We determine the level of the sea at any time by averaging the positions where the waves beat upon the shore, taking account of the fluctuations between the receding and incoming waves or ripples. But no one, except in a joke, would accuse the engineers, who thus elaborately try to 'determine' the level of the sea, of inconsistency when they also state that the level of the sea is determined by the attractions of the moon, etc. A Laughlin in astronomy might say that the level of the sea is determined not by the moon, but by the individual drops of water splashing on the shore; and that even those admit this who believe the moon theory when they come to actually determining the level of the sea!"

bers for general prices, P, and the volume of trade, T. "Each form of price index, P applicable to the equation of exchange, implies a correlative trade index, T, such that the product of the two is equal to ΣpQ, the right side of the equation of exchange.

$$\text{Since } PT = \Sigma pQ$$

$$\text{it follows that } T = \frac{\Sigma pQ}{P} \text{ (p. 385).}$$

Professor Fisher examines in detail forty-four different varieties of averages of index numbers of prices, including all the familiar forms, together with the correlative trade indices (p. 400 *et seq.*). After subjecting each variety of average to eight tests and finding that "no form of index number P, conforms perfectly to all the eight tests when a common base year is employed" he concludes that the best formula for P is $\frac{\Sigma p_1 Q_1}{\Sigma p_0 Q_1}$ * (p. 429). He chooses, then, "As one of the best index numbers of prices, the average price of the goods sold, those goods being measured in units worth a dollar in a base year; in other words, the ratio of a value of sales at actual prices to the value of the same sales if made at base prices; in still other words, the weighted arithmetical average of all price ratios, each ratio being weighted according to the value sold, reckoned at base prices" (p. 203). Practical considerations, however, led Professor Fisher to agree with Professor Edgeworth in recommending the median with its two neighboring quartiles "with a simple system of weights (whole numbers) based on expenditures, and changing from time to time for the sake of making better year-to-year comparisons" (p. 429). The disadvantages in having a base year remote from the years being compared caused Professor Fisher to recommend a variable base; the best base for any year is the previous year (p. 203). All of these recommendations are well advised. Professor Fisher comes to the additional conclusion that "the best index number for the purpose of a standard of deferred payments in business is the same index number

* The notation is as follows:
p_1 = price of any commodity in any year.
Q_1 = quantity of such commodity exchanged in such year.
P_0 = price of any commodity in the base year.

which we found it best to indicate the changes in prices of all business done" (p. 225).

After giving an historical summary of the statistics of money and prices beginning with the thirteenth century, Professor Fisher makes careful estimates of the items appearing in the equation of exchange for the years 1896–1910. It is only for this period that data are available for a reliable estimate of the amount of deposit currency, M', and its rapidity of circulation, V'. The five magnitudes in the equation of exchange are found as follows:

M, the amount of money in circulation in the United States, is found by subtracting "the money in the federal treasury and the estimate of money in banks reporting and unreporting" from the official estimate of money in the Unites States "corrected by means of recent revisions of the estimates of gold in the United States."

M', individual deposits subject to check, is found by adding to "individual deposits," as reported by the Comptroller of the Currency, the estimated unreported deposits and subtracting "deposits of trust companies and savings banks in national banks," "deposits in savings banks," and "exchanges for clearing house." The percentage of the remainder thus obtained that is subject to check is estimated from figures furnished by the Comptroller of the Currency and the National Monetary Commission.

$M'V'$ is estimated from Professor Kinley's figures giving the value of checks deposited on "the settling day nearest July 1, 1896," and on March 16, 1909, allowance being made for the exceptional character of the deposits on these days as evidenced by New York clearings. For the two years 1896 and 1909, the values of $M'V'$ were found to be 97 and 364 billions, respectively. The values of $M'V'$ for the intervening years are interpolated by using as a barometer New York clearings plus five times outside clearings.

V' is found by dividing $M'V'$ by M' for the corresponding year. This value varies from 36 in 1896 to 54 in 1909 with maxima in 1899 and 1906.

MV. Professor Fisher has achieved a triumph in ascertaining values, which appear to be exceedingly accurate, for the

total of money exchanges, MV, and the velocity of circulation of money, V. He shows that a coin or bill does not circulate indefinitely. After circulating a very few times, usually twice, each piece of money returns to a bank. When money is paid to a wage-earner (usually, a non-depositor) almost invariably it is given to a commercial depositor in exchange for goods, the latter depositing the money in some bank. Thus two exchanges, and two only, are effected by money paid to wage-earners. On the other hand, money paid to members of the professional and commercial classes (who are almost universally depositors) finds its way into a bank immediately, and hence is exchanged for goods or services but once. Consequently, if we take all the money deposited in banks (for which we have estimates for 1896 and 1909), add to it the expenditures of non-depositors (which can be estimated from the amount paid wage-earners, certain clerks, and farmers) and add to the sum a corrective factor for intra-class exchanges and other minor items we will obtain the total of exchanges effected with money, MV. The values for 1896 and 1909 are 16 and 35 billions, respectively, the corrective factor being about one billion in each case. Professor Fisher concludes, therefore, "that *money deposits plus wages, divided by money in circulation*, will always afford a good barometer of the velocity of circulation" (p. 476).

V is found to be 19 and 22 for 1896 and 1909, respectively. These results are obtained by dividing MV by M as found above. Values for intervening years are interpolated.

T, the volume of trade, is "constructed by averaging index numbers of the *quantities* (not the values) of trade in various lines. The figures are based on data for forty-four articles of internal commerce and twenty-five of export, sales of stock, railroad freight carried, and letters through the post office" (p. 291).

The preceding data are sufficient for the estimation of the relative general price level, $\frac{MV+M'V'}{T}$, with no reference to the prices of individual commodities. However, as a check to the accuracy of his previous estimates, Professor Fisher

estimates P directly. For this purpose he computes a weighted average of the Bureau of Labor index numbers of wholesale prices, Bureau of Labor index numbers of wages, and W. C. Mitchell's index numbers of the prices of forty stocks, with weights of 30, 1, and 3, respectively. Thus, there are two series of values for the "statistical verification" of the equation of exchange. They are as follows:

INDEX NUMBERS OF PRICES AS CALCULATED.

(*The Purchasing Power of Money*, p. 293.)

	Directly. (P)	Indirectly. $\left(\frac{MV+M'V'}{T}\right)$		Directly. (P)	Indirectly. $\left(\frac{MV+M'V'}{T}\right)$
1896	63	54	1904	85	81
1897	64	52	1905	91	83
1898	66	56	1906	97	90
1899	74	69	1907	97	86
1900	80	68	1908	92	87
1901	84	76	1909	100	100
1902	89	82	1910	104	105
1903	87	75			

The agreement between the two series is remarkably close. The "correlation coefficient" is 0.98. But, as Professor Fisher says, the correlation coefficient, computed in the usual way, does not measure the extent of correspondence of the year-to-year or minor fluctuations. If, instead of correlating the two series in the ordinary way, we compute the correlation coefficient for the *differences* or *ratios* between successive values of the two variables we obtain a measure of the correspondence of year-to-year fluctuations.* The reviewer has found the correlation coefficient computed by the method of *differences* for the period 1896–1910 to be 62 per cent. of perfect. Professor Fisher finds the coefficient of correlation between the year-to-year *ratios* for the years 1896–1909 to be 57 per cent., a figure indicating a moderately high degree of

* For an explanation of the method of differences which was suggested by Mr. R. H. Hooker, see the article by W. M. Persons on "The Correlation of Economic Statistics" in *The Quarterly Publications of the American Statistical Association*, December, 1910, p. 307.

correlation.* The correlation coefficient (0.98) for the original series is much greater than the coefficient (0.62) for the *differences* between successive values. The reason for this is to be found in the systematic increase of both sides of the equation for the period in question, 1896–1910.

Professor E. W. Kemmerer has made the only estimates which are directly comparable with those made by Professor Fisher.† The estimates by the former cover the period 1879–1908. Using the period common to both investigations, 1896–1908, Professor Fisher finds that by the method of year-to-year ratios "the coefficient for my figures is 54 per cent. (or .54±.11) as against 37 per cent. (or .37±.14) for Kemmerer's" (p. 295). The reviewer finds the correlation coefficient by the method of the year-to-year ratios for Kemmerer's figures for the period 1879–1895 to be 59 per cent. Kemmerer's figures thus give a higher coefficient between the year-to-year fluctuations of the two sides of the equation of exchange for the period 1879–1895 than do Professor Fisher's figures for the period 1896–1909. The reviewer finds that the ordinary correlation coefficient (which measures the correspondence between the whole values and not the differences) for Kemmerer's figures, 1879–1895, to be 0.55 as compared with Fisher's coefficient of 0.97 for the period 1896–1909. The period 1879–1901 only was covered in the first edition of Kemmerer's *Money and Prices*. The ordinary correlation coefficient for this period is 0.23, indicating no correlation between the two series of values. However, the ordinary correlation coefficient for the period covered in the second edition of Kemmerer's book, 1879–1908, is 0.48, indicating some degree of correlation. The coefficient of correlation between the year-to-year ratios of Kemmerer's figures for the period 1879–1908 is 0.52, which indicates that about the same correspondence between the fluctuations of Kemmerer's fig-

* It may be instructive to compare the correlation coefficient between the year-to-year price differences computed directly and indirectly (0.62) and the correlation coefficient computed for the year-to-year differences of corn production in the United States and the average farm price on December 1st of each year. The latter coefficient is, of course, negative, since it measures the amount of correspondence between production and price. It has been found by the reviewer for the period 1866–1906 to be −0.83. ("The Correlation of Economic Statistics," p. 314.)

† Kemmerer, Money and Credit Instruments in their Relation to General Prices. New York (Holt), 2d Ed., 1909.

ures exists as that (*i. e.*, 0.54) existing between Fisher's series for the shorter period, 1896–1908. The various correlation coefficients found for the year-to-year ratios show that the correspondence between Kemmerer's series is approximately the same as between Fisher's series except for the '90s, not entirely covered by Fisher. Inverse fluctuation of Kemmerer's year-to-year ratios occur in 1890, 1891, 1893, 1895, 1899, 1901, 1902, 1903 and 1907. Inverse fluctuations of Fisher's year-to-year ratios occur in 1898, 1900, 1904, and 1905. It is noticeable that Kemmerer's figures, but not Fisher's, include the years of falling prices in the '90s. Considering Kemmerer's and Fisher's results together, then, there is a correspondence between the year-to-year fluctuations of the two sides of the equation of exchange of from 40 to 60 per cent. of perfect; Kemmerer's figures for the period 1879–1901 indicate that the correspondence between the whole values of the two sides of the equation of exchange is small; Fisher's figures for the period 1896–1910 on the contrary show a close correspondence of the whole values.

Professor Fisher does well to emphasize the importance of securing a more stable unit of purchasing power than we have at present in the gold dollar. His proposal of the adoption of the gold-exchange standard combined with a tabular standard looks feasible. It should receive attention.

The nature of the matter presented in *The Purchasing Power of Money*, the lucid explanations, the careful proofreading, and the relegation of the more technical discussions to the appendices fit the book for use as a college text. In the opinion of the reviewer Professor Fisher's book takes its rank as the premier treatise on the theory of money.

REVIEWS AND NOTES.

CRIMINAL STATISTICS OF INDIANA.

Indiana might silence the lament that not a single state in the Union publishes adequate criminal statistics. This state has the needful law and should have the proper machinery in its long established Statistical Bureau. Elsewhere sufficient legislation to oblige the criminal courts to make returns of their business is lacking, or at best imperfect returns are made to a central office that is not organized for the task of digesting and presenting criminal statistics. As a matter of fact, most of the states do not concern themselves at all with the collection of criminal statistics. But Indiana has a Bureau of Statistics which, among other things, is specifically charged with the duty of collecting criminal judicial statistics.. Moreover, the bureau has all the necessary authority in law. It can prescribe the forms in which all courts of criminal jurisdiction shall make their returns as well as the separate items to be included; and, what is almost as important, it can compel the police officials to make returns of arrests, so that the apprehensions for specific offenses can be compared with the disposition of the cases tried by the courts. No other state has the same opportunities at the present time. It is therefore of special interest to learn what is being done.

The Indiana Bureau of Statistics has recently published its thirteenth biennial report, covering the years 1908–09. It is a formidable volume of more than 1200 pages, of which 433 deal with arrests and the disposition of cases in the criminal courts, while 27 pages are given to juvenile court statistics. Under the general title "Social Statistics" is presented not only facts about arrests and the doings of the criminal courts, but statistics of divorce, of coroner's inquests, of liquor licenses, of local option elections, etc. Why not dignify criminal statistics with their proper title? No complaint can be made about a niggardly use of space in spreading the police and court returns before the reader. Indeed, there are no less than 51 blank pages, that is, pages containing only the table skeletons! And 65 pages are merely adorned with from one to three items each. To illustrate: Under the head of "prize fighting," the report shows five blank pages, but on the sixth mention is made of half a dozen cases of this offense. The same number of pages is required to account for two cases of "raffling." But this reckless use of space for the purpose of saying nothing is only one of the minor shortcomings of the Indiana report.

First, there is given a summary table of criminal cases in the circuit and superior courts, showing, by counties, the number of criminal cases filed, dismissed, venued, disposed of; the number of convictions for felonies and misdemeanors, together with the numbers released on probation after conviction; and, lastly, the number of violations of the liquor laws and the number of convictions for such offenses. The summary leaves one wholly in the dark in regard to the numerical proportion of the different classes of

cases filed and dismissed, as well as in regard to the number of cases begun in previous years and disposed of during the biennial period and the number left unfinished although begun in 1908–09. In brief, the summary is of dubious meaning and omits facts of importance to a correct understanding of the business of the criminal courts. Then follow tabular statements of arrests and convictions for the different offenses that constitute felonies under the Indiana law and necessarily come before the circuit and superior courts. The number arrested is shown by sex, color, and nationality, and convictions are classified by the number fined or sent to the different state penal institutions; but no connection can be established between the items of personal description and the items of penalties except where a single individual or at most two or three were concerned. The exceedingly important element of age is ignored altogether. How many of those arrested escaped conviction one cannot tell, for there is no means of knowing how many of them were not brought to trial during the biennial period. Evidently little effort is made to get complete records. Although in regard to nationality the only distinction sought is between native and foreign born the proportion of "unknown" is so enormous that the whole tabulation is worthless. Even in the summary tables of felonies, totals by color, nationality, etc., are lacking.

The misdemeanant cases coming before the circuit and superior courts are tabulated in the same way; likewise the criminal cases coming before the city courts and justices of the peace. There is no summary of the whole criminal business of the Indiana courts, much less one affording the most elementary comparisons. Throughout proper classification and correlation are lacking and of explanatory text there is not a single line; yet the subject-matter is one that calls for intelligent comment in a peculiar sense. These Indiana statistics are simply transcripts of the crude material obtained from court records with a minimum of classification and wholly lacking in competent arrangement. To be sure, the patient student can make a few interesting computations on the basis of some of the figures given. But why should he be put to this tedious process by a bureau which purports to publish statistics of crime? Besides, he would at all times be baffled by elements of uncertainty and lack of facts required to make sure of the meaning of the most ordinary groupings.

The report contains some curiosities by way of nomenclature of offenses and affords one or two strange sidelights upon methods of dealing with certain offenses. Thus it appears that in 1908 the circuit and superior courts of Vigo County (Terre Haute is the chief city) sentenced no less than 1118 persons to imprisonment for drunkenness, while in 1909 apparently not a single person was so sentenced by the same court. In the 119 pages dealing with city courts and showing arrests and disposition of cases for specified offenses, the number of arrests is faithfully entered in each case for 1908 under the head of the Indianapolis city court, but there is nothing to indicate that a single person arrested came before the court in that year. A table dealing with "All other misdemeanors" shows the same condition in respect to this court. But, finally, a summary of "total misdemeanors"

is discovered which indicates that the Indianapolis city court after all was active in 1908. The explanation is, of course, that details were not secured for 1908, yet the reader is left to find this out for himself after wandering over more than 100 pages.

One is pleasantly surprised to find under the head of disposition of cases in justice courts, a statement of the total numbers acquitted as well as the number of cases in which sentence was suspended. How many persons tried for felony were acquitted is not told, as if that were a matter of minor significance.

Measured by the extent and social significance of the criminal statistical material available, the Indiana Bureau would certainly be justified in sending out a large report. During the biennial period 1908–09, more than 97,000 arrests were brought to the attention of the various courts; and of these 4297 were for felonious offenses. It is but a plain statement of fact that the effort to deal statistically with this large material has been a failure. In other states, where the volume of criminal cases may assume even larger proportions, not even an attempt is made to collect and present the facts; and Indiana is at least to be congratulated because there is intelligence enough to require the collection of criminal statistics. But the Indiana Bureau of Statistics cannot expect to be successful so far as the crime business is concerned until it adopts new ideals and radically different statistical methods. The problem is by no means an easy one. It is fairly evident that competent returns from the Indiana courts are not easily obtained. But, with all possible excuse on account of lack of adequate material and other inherent difficulties, it is undeniable that a far different and better use could have been made of the returns at hand.

JOHN KOREN.

MUNICIPAL FINANCES IN MASSACHUSETTS.*

The state of Massachusetts has recently been making an important experiment in the reform of municipal accounts. The first law † looking to the establishment of uniform accounting systems in the various municipalities of the Commonwealth was passed in 1906. The legislature preferred to proceed indirectly, and the terms of the act were limited to the requirement that the auditor or other accounting officer of each city and town of the state should furnish annually to the Director of the Bureau of Statistics, on blanks and uniform schedules provided by him, a detailed statement covering the chief financial transactions for the preceding fiscal year. This legislation has been amended and supplemented by subsequent acts ‡ looking to the further standardizing of municipal accounts and providing,

* Second Annual Report of the Statistics of Municipal Finances for City and Town, Fiscal Years Ending between November 30, 1907, and April 6, 1908. By the Director of the Bureau of Statistics, Boston, 1910.

† Chapter 296, Acts of 1906.

‡ Chapter 371, Acts of 1909; Chapter 598, Acts of 1910; Chapter 616, Acts of 1910; Chapter 624, Acts of 1910.

under conditions, for the installation of accounting systems in keeping with the classifications of the Bureau of Statistics.

The first fruit of this legislation was the annual report of the Chief of the Bureau of Statistics which appeared in 1908 and covered the municipal fiscal years ending between November 30, 1906, and April 1, 1907. This report has been characterized as a noteworthy publication both by reason of its significance and because of its contents,* but it may very properly be regarded as a preliminary to the publication of the second report, a document which may not unjustly be called a real contribution to the study of American municipal finance.

The report under review is in many respects similar to its predecessor, but it represents a far more detailed and systematic working out of the original scheme of classification and a far more comprehensive exposition of the general condition of municipal finances in Massachusetts. This report contains complete tabulations for the thirty-three cities of the Commonwealth and the sixty-five towns having a population of 5,000 or over, as well as less complete data for two hundred smaller towns, and is a model of clearness, accuracy and attractiveness. Part I is separated into five divisions, each showing a different phase of municipal finances. Division A contains a summary of the transactions of the thirty-three cities graded according to the population of 1905, receipts and payments being analyzed and grouped in such a way as to facilitate study and comparison. Division B is devoted to a detailed analysis of receipts from revenue, Division C to payments for maintenance, Division D to debt transactions, and Division E to cash balances. Part II contains, similarly, the financial transactions of the sixty-five towns of over 5,000, and Part III is devoted to the financial transactions of the two hundred smaller towns which endeavored to comply with the law, but whose data did not warrant the same tabular detail as that given to Parts I and II.

Not the least important part of the report is the Introduction, in which the author discusses very frankly the points at which it seemed best to depart from beaten paths, and enters, to some extent, into the nature and limitations of the tables. On the question of interpretation he is naturally cautious. He takes the trouble to emphasize and reiterate the fact that the value of comparative statistics depends upon the intelligence and sound judgment with which they are used, and that the figures of the report are useful and significant only in so far as they are accepted not as a finality, but rather as a starting point for local inquiry. And in this he is, of course, right. There are too many local considerations and differences to permit the use of the report as a basis for long-range study of conditions in individual cities. At the same time, I cannot help feeling that this cautiousness on the part of the author, this apparent fear of lending the work to unwarranted conclusions, has given the report its one great defect—a conspicuous lack of statistical analysis. The author states his position very clearly on this point,† but I believe his position is extreme.

* *Cf* a review of this report in an article entitled "The Cost of Municipal Government in Massachusetts," by E. M. Hartwell. Quarterly Publication of American Statistical Association, December, 1908.

† Introduction, pp. XVI and XVII.

Certainly it would seem better that some of the conclusions drawn from the work should be false than that there should be no conclusions at all. The material is all there for him who is willing to analyze it, but there's just the rub. I take it that a publication of this kind is designed for the instruction of the layman as well as of the student of finance, and it is almost too much to hope that the enthusiasm of the former will tide him over the use of the slide rule and the adding machine. Yet it must be admitted that there are several grave objections to the use of per capita statistics in intercensal years.

Following the Introduction is a concise statement of the classification and terms used in the report.* The principles laid down here constitute the framework of the entire report. It is through an understanding of these principles that the figures are given their life and clearness. The classification is along the lines suggested by the National Municipal League and developed by the United States Bureau of the Census, but the arrangement is more logical, the definitions are more concise, and, above all, the writer doesn't seem to be lost in the maze of his own verbosity. Aside from these considerations, it is impossible to overestimate the importance of placing this material at just this place. Correct classification lies, as every one knows, at the very taproot of municipal reform; and it is useless to hope for substantial improvement in municipal finances as long as municipal accounts are thrown together in such a way that it requires a corps of experts to unravel and interpret them.

More interesting, however, than the form of the report is what the figures tell us about the finances and the activities of these ninety-eight municipalities. The combined population of the ninety-eight cities and towns was 2,574,809, according to the State Census of 1905, and combined expenditures for the fiscal year ending in 1907 and 1908 amounted, approximately, to $68,000,000. Aggregate revenue receipts amounted to $66,776,618.41,† of which $51,993,057.67 was attributable to receipts from *general* revenue and $14,783,620.74 to receipts from *commercial* revenue. Of the *general* revenue receipts, $48,811,343.42 was derived from taxes, chiefly property and poll, $2,594,901.07 from licenses and permits, and the rest from minor sources. Of the *commercial* revenue receipts, $9,848,080.37 ‡ was derived from public service enterprises, $2,359,785.81 from the various departments and $1,068,247.18 from special assessments. Aggregate charges against revenue amounted to $67,805,698.24. Of this amount, $44,644,226.48 went to the support of the various departments—general government, protection of life and property, highways, education, charities, etc.,—$3,953,376.95 to the maintenance of public service enterprises, $10,516,122.35 to payments for interest, $4,076,281.20 to revenue debt requirements, and $4,178,680.68 to sinking funds.

From the standpoint of revenue received, current payments exceeded

* For a fuller statement, *cf* Municipal Bulletin No. 1, "A Uniform Classification of Municipal Receipts and Payments," etc. Boston, January, 1910.

† Introduction, p. VI.

‡ $3,953,376.95 was expended for public service enterprises—chiefly waterworks, and $3,250,202.76 for interest on loans for this purpose, leaving a balance of $2,644,500.67.

current revenue receipts in twenty-seven of the thirty-three cities having a population of more than 14,000, the total excess being $2,070,903.33. The other six cities show a balance in this respect of $304,065.30. Towns having a population of 5,000 or over make a better showing, only eighteen of the sixty-five having excess payments, and these last amounting to only $159,880.81. It does not follow, however, that an excess of payments over current charges against revenue necessarily indicates a lack of wisdom or foresight on the part of the municipal officials concerned. It might arise, as the author of the report is careful to point out, from failure to collect revenue which had been assessed. Specifically, this did happen in the case of the city of Boston, which showed excess payments to the amount of $902,947.79, but outstanding uncollected taxes for the year of $957,591.19.

The assessed valuation of the ninety-eight municipalities for the year 1907 was $3,152,612,484—$2,626,946,083 being assessed to the thirty-three cities and $525,666,401 to the sixty-five towns. The net* indebtedness for the year was $150,936,947, or $60.18 per capita. The net debt of the thirty-three cities was $131,243,203, or $64.33 per capita, or $50 per $1,000 assessed valuation, and that of the sixty-five towns was $19,673,784, or $35.77 per capita, or $37.50 per $1,000 assessed valuation. The figures given here include all outstanding indebtedness—temporary loans, unpaid warrants, etc.,—but making due allowance for this, it would seem that the per capita indebtedness of the cities—$64.33—is high, to say the least. During the year the cities increased their net indebtedness by $7,055,183.99 and the towns, by $1,275,912.56. The interest burden for all outstanding obligations amounted to $10,516,122.35, of which $9,268,827.80 was borne by the cities and $1,247,299.55 by the towns.

But the interest of both the economist and the practical man of affairs is now centering around the question of municipal expenditures. In view of the increasing tendency of people to concentrate in cities, the cost of municipal government has become a matter of very vital concern. Some one has already pointed out that from this point of view the public official responsible for a system of accounting is conducting a laboratory which must produce the data essential to the solution of some of our greatest problems.† Shall we say that increasing population ought to bring with it a decrease in per capita debt and a decrease in per capita taxation, or that social units may, like individuals, measure their needs and luxuries by actual or probable income, *i. e.*, by the rising tide of taxable wealth? Or shall we hold, as does Professor Henry C. Adams in his very excellent "Science of Finance," ‡ that with the advance of civilization protective functions tend constantly to decrease and developmental functions tend constantly to increase in their claim upon the social income? The difficulty about all theories of this kind is that it is not yet possible to submit them

* Net debt—total funded or fixed debt, less the amount set aside in sinking funds to pay the debt when due.

† Professor Charles F. Bullock in an address at the meeting of the Boston City Auditors, July 18, 1908. Quoted in "The Cost of Municipal Government in Massachusetts." Public Document No. 70, Boston, 1908.

‡ Chapter III, pp. 55 *et seq.*

to statistical proof. Up to the present time there has been little or no material collected for such a purpose, and even where such material has been collected it has been presented in such irregular and chaotic form as to preclude a serious comparison of facts relating to any selected number of political units. The great value of the present report lies, it seems to me, in the fact that we have here some figures which really count—figures which, though limited to a comparatively small number of cities and towns, are comparable, clear, and, above all, trustworthy. And while it would be absurd to make these figures the basis of long-range study of purely local conditions or of any broad conclusions in connection with the theory of public expenditures, yet it cannot be denied that, taken in the aggregate, the expenditures of these ninety-eight municipalities ought to throw some light upon certain phases of our municipal activities, particularly upon the all-important question of the relative cost of municipal government. At any rate, they may be regarded as straws which indicate the direction of the wind.

Including unclassified expenditures, which are relatively unimportant, and the amount devoted to soldiers' benefits, the aggregate cost of all the municipal departments for the year was $44,644,265. The aggregate per capita maintenance cost was $17.33,* with the following main divisions: general government, $1.29; protection of life and property, $3.68; health and sanitation, $1.65; highways and bridges, $2.67; charities, $1.19; education, $5.26; libraries, $0.37; recreation, $0.57. The average per capita valuation was $1,224 and the average per capita debt, $58.62.

Perhaps the first thing which strikes the attention is the fact that the city of Boston, with its 40 square miles and 600,000 inhabitants, heads the list not only in per capita expenditure for departmental maintenance, but in per capita expenditure under all the separate heads. This is especially striking in the case of general government, $2.21; protection of life and property, $6.28; health and sanitation, $3.51; charities, $2.25; education, $6.29; and recreation, $1.65. The increased expenditure for public health and sanitation, for education, and for recreation may very justly be regarded as a natural outgrowth of the increased demands of life in a large city, but the exceptionally high cost of general government, of protection of life and property, and of charities and corrections must be explained, it seems to me, on other grounds.

In considering relative expenditures, the most natural basis of comparison is to be found in the division of the municipalities into cities and towns. There are thirty-three cities with an aggregate population of 2,024,325 ranging from 14,000 to 600,000, and sixty-five towns with an aggregate population of 550,484, ranging from 5,000 to 14,000.† Here the average per capita expenditures invariably increase as we pass from the smaller to

* In computing the per capita expenditures, it seemed best to use the population determined by the State Census of 1905. The per capita figures are, therefore, a little larger than they would be, had it been possible to secure accurate statistics of population for 1907. This fact does not, however, seriously affect the value of the figures as bases for the comparisons which follow.

† For obvious reasons Brookline, 23,436 inhabitants, and Hyde Park, 14,510 inhabitants, were placed in the list of towns.

the larger group. How great this increase is can be seen in the following table:

	Population 1905.	Per Cap. Valuation.	Total Maintenance.		General Government.		Protection of Life and Property.		Health and Sanitation.	
			Per Cap.	Per $1,000	Per Cap.	Per $1,000	Per Cap.	Per $1,000	Per Cap.	Per $1,000
33 Cities	2,024,325	$1,297	$18.22	$14.04	$1.38	$1.06	$4.01	$3.09	$1.92	$1.48
65 Towns	550,484	955	13.72	14.36	.96	1.00	2.48	2.59	.65	.68

	Highways and Bridges.		Charities.		Education.		Recreation.		Libraries, etc.		Net Debt.	
	Per Cap.	Per $1,000	Per Cap.	Per $1,000	Per Cap.	Per $1,000	Per Cap.	Per $1,000	Per Cap.	Per $1,000	Per Cap.	Per $1,000
33 Cities	$2.70	$2.08	$1.24	$0.97	$5.35	$4.12	$0.66	$0.50	$0.49	$0.37	$64.33	$50.00
65 Towns	2.59	2.71	.99	1.03	4.93	5.16	.23	.24	.35	.36	35.77	37.50

It will be noted, too, that expenditure per $1,000 assessed valuation is higher except in case of "total maintenance," "highways and bridges" and "charities." This is notably true of expenditures for "protection of life and property" and for "health and sanitation."

But the objection may very properly be urged against this comparison that it is a comparison of things which are essentially unlike, that is, of urban conditions with conditions which are decidedly rural. A comparison based upon the relative expenditures of the cities alone would be more to the point. For this purpose the city of Boston has been placed in a class by itself and the remaining cities divided into two classes: first, cities ranging in population from 49,000 to 128,000 and second, cities ranging in population from 14,000 to 49,000. The city of Boston had, according to the State Census of 1905, 595,380 inhabitants, or 14,920 inhabitants to the square mile. Its per capita valuation in 1907 was $2,205 and its net debt $117.55 per capita, or $53.21 per $1,000 assessed valuation. The following figures show its expenditures per capita and per $1,000 assessed valuation: total maintenance, $27.34—$12.39; general government, $2.21—$1.03; protection of life and property, $6.28—$2.84; health and sanitation, $3.51—$1.59; highways and bridges, $3.54—$1.60; charities, $2.25—$1.02; education, $6.59—$2.29; recreation, $1.65—$0.74; libraries, $0.57—$0.25.

Coming now to the other cities, we find that the cities of the first class have an average population of 76,403, an average density of 3,756 inhabitants to the square mile, and an average per capita valuation of $932, and that the cities of the second class have an average population of 28,085, an average density of 1,376 inhabitants to the square mile, and an average per capita valuation of $901. The average per capita expense for all

departmental purposes is, as the tables show, $14.63 per capita, or $15.69 per $1,000 assessed valuation, for the group of larger cities and $14.29 per capita, or $15.86 per $1,000, for the smaller—an increased per capita cost of only $0.34, or 2⅔ per cent. In a well-developed, homogeneous commonwealth like Massachusetts this difference is probably not so great as it would be if the comparison were made between the cities of a newer community.

Expenditures for general government—legislative, executive, and judiciary—show a perceptible decrease as we pass from the smaller to the larger cities, being $1.11 per capita, or $1.23 per $1,000, in the case of the former and $0.99 per capita, or $1.07 per $1,000, in the case of the latter—a difference of about 11 per cent. on the side of the larger cities.

The item "protection of life and property" shows a perceptible increase as the size of the city increases. The larger cities expended for this purpose $3.19 per capita, or $3.42 per $1,000 assessed valuation, while the cost to the smaller cities was $2.98 per capita, or $3.31 per $1,000. In other words, it cost the larger cities about 7 per cent. more per capita to protect life and property. The two chief items under this head are protection against fire and police protection. Expenditures for the former may naturally be expected to increase as the city increases in size and density. The similarity of the two groups in size and general conditions makes the difference here relatively unimportant, but when taken in connection with the tremendous outlay for this purpose by the city of Boston, $6.28 per capita, and the relatively small outlay by the towns, $2.48, the figures seem to point to the disappointing fact that men grow worse, and not better, as they are more and more subjected to the competition and close contact of the crowded city.

One would expect expenditures for health and sanitation to increase with density of population, and the figures bear out this supposition. In the larger cities, the average per capita expenditure for this purpose is $1.46, or $1.57 per $1,000 assessed valuation. In the smaller cities it is $0.98, or $1.09 per $1,000. The difference here is $0.48, or nearly 49 per cent.

Average expenditures for highways and bridges are for the cities of the first group $2.37 per capita, or $2.54 per $1,000, and for the cities of the second group $2.33 per capita, or $2.59 per $1,000. In view of the increased necessity for good roads and good streets brought about by the larger traffic incident to concentration of population, and in view of the recognized superiority of the larger city over the smaller in this particular, it is probably safe to conclude that this is one of the disappointingly small number of instances where concentration and combination bring economy in the matter of public management and control.

The average per capita expenditure for "charities" is nearly the same in the two groups, being $0.83 in the first and $0.81 in the second. But, again, if we take the figures in connection with the high per capita expenditure of the city of Boston, $2.25, it seems safe to conclude that expenditures for the relief of poverty and distress will increase with density of population.

The figures under the head of "education" are interesting and suggestive not only in and for themselves, but because they show some marked differences from the other items of outlay. They are more uniform in the case of cities of similar area and population, and they show no marked tendencies in either direction. The cost per pupil is probably greater in the larger cities than in the smaller, but the difference is undoubtedly due to the superior article furnished rather than to any tendency of per capita expenditure for this purpose to increase with numbers. The comparative uniformity of these figures, too, is probably due to the high development of the school system in Massachusetts, and to the fact that the latter grew from the town, or district, school up, rather than from the college or university down.

What has been said about expenditures for education may also be said, perhaps with a smaller degree of accuracy, of expenditures for libraries and reading rooms—except that there are several striking variations, attributable no doubt to local differences in support and management.

Expenditures for "recreation," however, show some remarkable differences. Many of these differences undoubtedly arise from differences in area and in other purely local conditions, but some of them are very probably due to the very common neglect of this important side of municipal development. The averages show an increase of more than 50 per cent. in the per capita expenditure of the larger cities over the smaller, and again the striking thing is the relatively large per capita expenditure, $1.65, of the city of Boston. The per capita outlay for this purpose by the latter city is larger than the combined per capita outlay of Worcester, Fall River, Cambridge, Lowell and Lynn, the five next largest cities in Massachusetts, or of Marlboro, Melrose, Woburn, Newburyport, Beverly, Medford, Northampton, Chicopee, North Adams, and Pittsfield, the ten smallest cities—a forceful illustration of the necessity of parks, playgrounds, etc., in the larger centers of population. Another interesting fact brought out by the tables and mentioned in the report (p. XXII) is that the municipalities embraced in the so-called Metropolitan Park District spend, in spite of their contribution to this system, more on local parks than do cities and towns of corresponding size outside the district.

The figures on which the foregoing comparisons have been based are shown in the following table:

	Aggregate Population 1905.	Population per Square Mile.	Total Maintenance.		General Government.		Protection of Life and Property.		Health and Sanitation.		Highways and Bridges.	
			Per Cap.	Per $1000	Per Cap.	Per $1000	Per Cap.	Per $1000	Per Cap.	Per $1000	Per Cap.	Per $1000
City of Boston	595,380	14,920	$27.24	$12.39	$2.21	$1.03	$6.28	$2.84	$3.51	$1.59	$3.54	$1.60
Cities: 40,000 to 128,000	840,430	3,756	14.63	15.69	.99	1.07	3.19	3.42	1.46	1.57	2.37	2.54
Cities: 14,000 to 40,000	568,521	1,276	14.29	15.86	1.11	1.23	2.98	3.31	.98	1.09	2.33	2.59
Towns: 5,000 to 14,000	550,484	.....	13.72	14.36	.96	1.00	2.48	2.59	.65	.68	2.60	2.71

	Charities.		Education.		Recreation.		Libraries.		Net Debt.		Valuation.
	Per Cap.	Per $1000	Per Cap.	Per $1000	Per Cap.	Per $1000	Per Cap.	Per $1000	Per Cap.	Per $1000	Per Cap.
City of Boston	$2.25	$1.02	$6.59	$2.99	$1.65	$0.74	$0.57	$0.25	$117.55	$53.31	$22.05
Cities: 49,000 to 128,000	.83	.89	4.74	5.08	.29	.31	.31	.33	41.90	44.95	9.32
Cities: 14,000 to 49,000	.81	.89	4.98	5.53	.19	.21	.37	.41	44.20	49.05	9.01
Towns: 5,000 to 14,000	.99	1.03	4.93	5.16	.23	.24	.35	.36	35.77	37.50	9.55

It will be noticed that in passing from the smaller to the larger groups, expenditures per $1,000 assessed valuation decrease in the case of "total maintenance," "general government," "highways and bridges" and "libraries," increase in the case of "health and sanitation" and "recreation" and vary in the case of "protection of life and property," "education" and "charities."

Attention was called at the outset to the fact that it would be dangerous to attempt to draw general conclusions from a comparative study of the expenditures of so small a number of cities, particularly without a thorough consideration of local conditions. In so far as these limitations may be brushed aside for the moment, the material in this report seems to indicate the following general tendencies of cost to the individual in connection with the growth of population and increase in its density: (a) a slight decrease in the cost of general government; (b) a marked increase in the cost of protection of life and property; (c) a reasonable and justifiable increase in expenditures for health and sanitation; (d) a slight decrease in the cost of such improvements as highways and bridges; (e) a very perceptible increase in the amount spent for charities and corrections; (f) a steady increase in the amount spent for education and for libraries (offset, no doubt, by the superior facilities afforded in the larger town); (g) a tremendous increase in the amount spent for recreation.

In a general way, it may be said that the increase in average per capita cost as we go from the smaller to the larger unit seems to indicate that the conduct of the protective and developmental functions on the part of the public does not follow the law of diminishing cost, *i. e.*, of cost decreasing in proportion to the development of large-scale production and management. The figures here, it will be remembered, are $13.72 for the sixty-five towns, $14.29 for the cities having from 14,000 to 49,000 inhabitants, $14.69 for the cities having between 49,000 and 128,000 and $27.34 for the city of Boston. This comparison loses some of its force, however, when the question of the growth and extension of municipal functions is introduced, and when the item of per capita wealth is considered. In other words, the large city does undoubtedly perform a large number of services for its inhabitants which the citizen of the small city is forced to perform for himself, and the increase in per capita wealth, or ability to pay, usually equals, and often surpasses, the increase in per capita expenditure. At the

same time, the real question is not, after all, whether the citizen of the large city is more able to pay than the citizen of the small town or the citizen of the rural district, but whether we may reasonably expect combination and concentration of the protective and developmental machinery of the public to bring to public enterprise those advantages which combination and large-scale business almost invariably bring to private enterprise.

ROBERT H. TUCKER.

LOUISVILLE, KY., November 10, 1911.

THE SPECIAL REPORT OF THE UNITED STATES CENSUS ON STATISTICS OF CITIES HAVING A POPULATION OF OVER 30,000 IN 1908.

Unlike the previous special reports on cities, issued by the United States Census Bureau, this one could more properly be called "Financial Statistics of Cities having a Population of over 30,000," because the physical data heretofore published along with the financial data are reserved for separate study. Although special in the sense of covering intensely a definite field, the report may be looked upon as regular, for we are now in possession of comparable data for the years 1902–1908 for cities of this class.

There are some departures in this report from the standard formerly followed of which the separate tabulation of Receipts by Municipal Service Enterprise, and the summary of Total Payments and Receipts, municipal and agency (Table 3) should be mentioned.

The portion given over to accounting terminology is smaller than the corresponding part in former reports, but the main items are again defined in the hope that "further discussion of these definitions will result, and that the number of cities adopting these terms will be increased." Of these definitions and the part they have played in the accounting and publicity work of some of the state bureaus it is unnecessary to speak. Suffice it to say, in this connection, that not only does such clarified thought stimulate the work and make simpler the task of getting comparable financial statistics of cities, but at the same time it serves as a valuable aid in helping to reduce the subject of public finance to a scientific basis. The definitions should constantly be consulted by all students of municipal government and finance.

Among the recommendations found in the report are those touching the establishment of uniform fiscal years for cities, for a more precise classification of debt obligations according to purpose, etc. Others bearing upon the accounting features of the Report, such as the failure to give credit to different enterprises for materials or services furnished by them to the various departments are scattered through the text.

The statistical matter is varied and extensive, covering as it does payments for general expenses, for special service expenses, for invested funds, for interest on debt; payments for outlays by purposes; payments on

account of debt, etc. Revenues are treated in the same general detail; receipts from general revenue, from special service revenue, from special assessments and privileges, from departmental services, from receipts from interest, etc., making numerous pages of detailed tables. In the same inclusive manner are the subjects of debt outstanding at the close of 1908, both funded and special assessment, together with the changes in the debt during the year, given consideration. Besides these data the assessed value of property, and the replacement values of public improvements, total and per capita payments for meeting governmental costs, etc., are printed in detail. Whatever doubts one may have of the accuracy with which these statistical arrays reflect the financial status and transactions of American cities, he must admire the display of courage and energy which has made possible the reduction of American city finance to a near comparable basis.

A realization of the significance of the contents of this Report comes only after close and intimate study, not only of the figures themselves, but of the principles which have governed their distribution. Unfortunately, both are difficult because of the almost total divorcement of the tables and the text applicable thereto, as well as the almost complete absence of any summary of general or specific conclusions which the figures support. It may be choosing the wiser part for the Census officials to refrain from both drawing definite conclusions and pointing out general truths, yet such failure places the outsider, who does not know and cannot know the inaccuracies and incompleteness of the data, in a compromising position when he studies them to determine the trend of city finance.

Hazardous as specific comparisons may be, the reviewer will venture to point out some of the significant things in relation to the subjects of debt and expenditure for outlays or permanent improvements, etc.

Most independent political corporations in the United States are accorded the power of borrowing money. Such corporations for the 158 cities with population of over 30,000 are given in Table 2. Seventy of these reported school districts; and five, park districts as having such power. Other jurisdictions besides these are accorded this privilege. Of a total outstanding gross debt in 1908 of $2,109,220,215, 94.5 per cent. was incurred by the city corporations, 2.2 per cent. by independent school districts, and 3.3 per cent. by other corporations. Of this $2,000,000,000 plus gross debt, over $1,800,000,000 was funded or long time debt. If we add to the latter the special assessment debt outstanding we have a total long time debt of $1,900,000,000 of which 16.12 per cent. was issued for water supply systems; 1.15 per cent. for libraries, art galleries, and museums; 6.85 per cent. for parks and gardens and 11.4 per cent. for school buildings and sites. The amounts issued for funding and refunding were respectively 8.50 per cent. and 4.5 per cent. of this amount. Of the debt for water supply systems 59.8 per cent. was incurred by cities having a population of 300,000 and over, while the proportions for these cities for libraries and parks were 90.08 per cent. and 85.20 per cent. respectively. Cities with population of 100,000–300,000 incurred 21.45 per cent. of all the debt for water supply

purposes, but only 7.42 per cent. and 9.37 per cent. respectively, for libraries and for parks.

The revenue loans, or loans made in the anticipation of taxes, outstanding at the close of 1908 equalled $131,156,616. Of these, the cities of Group I reported $107,943,941 or 82.30 per cent. Of the $107,000,000 plus New York City reported $88,000,000, or 81.63 per cent., while of Group II, Jersey City, St. Paul, Rochester, Seattle, and Hartford, Conn., reported 66.22 per cent. These figures help to explain the almost negligible receipts on current bank deposits reported by New York and other cities. (Table 15, pp. 222 et seq.) Revenue loans of this type which are paid when the taxes against which the loans are drawn are collected are not ordinarily counted as debt in the constitutional sense, and are a recurring item in the financial transactions of most cities.

Most of the cities reported special assessment loans. The total of such debt outstanding at the close of 1908 was $95,000,000 plus, of which the cities with population of 300,000 and over reported $51,000,000. New York City alone reported $34,000,000, yet this type of loan constituted but 3 per cent. of the total indebtedness of those cities with population of over 300,000, while it constituted 8 per cent. of the debt for those cities with population of 100,000–300,000. The purposes of these loans were so indefinitely reported that the Census officials found it necessary to tabulate 84.7 per cent. of them under the heading "combined or unreported purposes." All of those for New York City and for some others were so tabulated.

Of the 158 cities, 126 increased and 32 decreased their gross debt during 1908. The increase was $212,304,626, and was equivalent to ten per cent. of the outstanding debt. The increase in the sinking fund assets during the year was $26,426,770, and was equal to 6.76 per cent. of the total value of this fund (p. 239). In 1908, the sinking fund constituted 21.2 per cent. of the funded debt, while in 1906 it constituted 22.6 per cent. This decrease can probably be explained by the increasing use of serial loans for which no sinking fund is necessary. Either the sinking fund is more common in the larger cities than in the smaller ones, or the requirement for its maintenance more rigidly lived up to, for the proportion between sinking fund and funded debt varied from 12.76 per cent. for the smallest cities under review to 23.54 per cent. for the largest cities.

In view of the importance which is assigned in England, for example, to the time municipal bonds are allowed to run, and to the equating practice there followed, as well as to the lack of all scientific treatment of this problem in the United States, it is interesting to notice that 48.06 per cent. of the outstanding funded debt and special assessment loans in 1908 mature later than 1928, *i. e.*, one half of the debt runs more than twenty years. The corresponding figure for the cities of Group I is 55.87 per cent. This group of cities reported 84.75 per cent. of all the debt maturing *after* 1928, but only 72.90 per cent. of the total outstanding debt. New York City reported 67 per cent. of her debt as maturing after 1928; Boston, 51 per cent.; Chicago, 0.0 per cent.; Portland, Ore., 15 per cent., etc. The

maximum deviations of the amount of debt maturing each year for the twenty-one years following 1908 for the different groups are : Total, 66.2 per cent.; Group I, 151.4 per cent.; Group II, 145.9 per cent.; Group III, 158.9 per cent. and Group IV, 265.5 per cent. This does not lend much support to the contention of those who maintain that the regularity of debt creation is such that debt could in large measure be replaced by an adjustment of the tax rate.

The total payments of the 158 cities under review for outlays in 1908 was $269,333,000. This is an increase over like expenditure in 1902 of 110.3 per cent. In 1902, 66 per cent. of these payments were from revenue, while in 1908 only 49.2 per cent. came from revenue. While the per capita payments for these purposes in 1905 was $8.29, in 1908 it was $11.32. Over this period the increase for cities with population of 300,000 and over was $2.79, while for those with population of 100,000–300,000 it was $4.53. Cities sometimes borrow for other purposes than outlays as the figures in Tables 8 and 9 indicate. The excess of receipts over payments on account of debt (Table 9) is greater than the total payments for outlays (Table 8) for eighteen cities of the 158, and amounts to $27,167,916, *i. e.*, this money was borrowed for revenue purposes. On the other hand, for all the cities, the total payments for outlays is greater than the excess of receipts over payments on account of debt by $62,600,000, which means that this money was furnished from revenue.

A study of the interest rate on outstanding debt given in Table 25, shows that for all cities 28.47 per cent. of it bears 3½ per cent. interest, and 33.71 per cent. bears 4 per cent. interest. The percentages of 3 per cent. debt for the individual groups are 33.66 per cent. for Group I; 17.91 per cent. for Group II; 11.71 per cent. for Group III; and 8.37 per cent. for Group IV. Cities with population of 50,000–100,000 borrowed more than one half of their outstanding debt at 4 per cent., while those of population of 300,000 and over borrowed scarcely more than one fourth at this rate. The causes of these differences are not pointed out by the Census officials, and it is questionable if there is any single reason assignable in all cases. Since the security in case of municipal debt is invariably the taxing power and ultimately rests on the presence of taxable value, there may be some close relation between the amount of debt outstanding and the interest rate. Yet this relationship even in cities equally distant from the money market is not a complete explanation. Cincinnati, Ohio, for example, with a per capita debt in 1908 of $128.61 paid 3.86 per cent. net interest on her bonds issued in 1908, while Toledo, Ohio, with a per capita debt of only $46.49 in 1908 paid 4.15 per cent. net interest on her issues for the same year. Neither are constitutional and legislative restrictions a guarantee of low interest on municipal bond issues. What are the forces which give one city excellent credit and make the bonds of another almost unsalable? Surely they are not the possibilities of repudiation. Could it be the lack of business acumen and foresight, and the inferior bargaining power of some city officials as compared with others in dealing with the financial market!

Tables 29, 30, 31, and 32 deserve extended comment, but this review is

already too long. In Table 29 all refund payments, counterbalancing, investment, trust and nominal payments and receipts are eliminated and the "transactions of the different cities are placed upon a net" and comparable basis. In the other tables mentioned the payments and receipts for meeting governmental costs are reduced to a percentage and a per capita basis.

A few errors have crept into the report. The receipts from revenues of water supply systems are given on page 41 as $54,422,470; on page 217 they are given as $55,268,043. Pittsburgh, Pa., on page 244, is reported with an outstanding special assessment debt of $202,938, and on page 251 the same city is charged with $2,439,738 of special assessment loans under "combined or unreported purposes." A like error occurs for Newport, Ky. In the discussion of Table 24, page 49, the amount of debt outstanding in 1908, which matures later than 1928 is given as $909,436,502. In Table 24, page 257, this amount is given as $931,119,502. Moreover, all comparisons of total debt outstanding on municipal properties, such as those on pages 51 and 52 of the text, are unsafe both because of the method of evaluation, admittedly inaccurate (p. 50), and because of the failure to take account of the *time* element in the value of such properties. It is not correct to say, as the Report does on page 52, "that somewhat more than one half of the reported valuation of the properties of departments has already been paid for by the cities from revenues received." It would be correct to say, if one wishes to make such a comparison, that of the total reported valuation somewhat less than one half is at present covered by outstanding debt.

Two suggestions of technique in the presentation of the tables occur to one in studying the Report: First, The use of the tables and the corresponding text would be facilitated by printing the text alongside of the table to which it applies. Second, The columns in the tables should be numbered consecutively from left to right, and all references in the text to the tables should be by column number.

When all criticisms both favorable and unfavorable are made, the conclusion is inevitable and the evidence overwhelming that there is great value in the production of such a report, when it is considered both from the statistical matter which it contains and the stimulus which its production gives to the study of municipal finance.

HORACE SECRIST.

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Cost of Living in American Towns. Report of an Enquiry by the Board of Trade into Working Class Rents, Housing and Retail Prices, together with the Rates of Wages in Certain Occupations in the Principal Industrial Towns of the United States of America. With an introductory Memorandum and a Comparison of Conditions in the United States and the United Kingdom. London: His Majesty's Stationery Office. 1911. (Cd. 5609) Pp. xcii, 533. Price 5*s.* 1*d.*

The British Board of Trade has followed up its reports on wages and the cost of living in the United Kingdom, Germany, France, and Belgium with a ponderous volume, the bulkiest of the series, on the United States. The purpose of this report is, primarily, to compare conditions of living in this country and in Great Britain. The Board of Trade has therefore employed in this investigation the same methods that were used in the report on the British Isles. It has ascertained with some fulness of detail, in certain selected cities, wages in given occupations, rents and housing accommodations, food-prices, and the amount of expenditure for food and rent in the family budget. The data gathered were combined in the same manner as the British figures, and the results obtained for the two countries are put side by side. But, apart from this comparison, the abundant material presented in the Report and the somewhat novel methods of its statistical elaboration make it a valuable document to the American student.

Twenty-eight cities, situated east of the Mississippi, or on its banks, were selected as representative of industrial conditions in this country. These cities, ranging in size from New York to Muncie, Ind., are situated in eighteen different states, and comprise altogether a population of over 15,000,000. In each city were ascertained the wages and prices prevailing in the month of February, 1909, except that for the building trades the wages of the following summer are given.

An instructive account of the characteristic features of these twenty-eight cities, one by one, with detailed statistics, fills the body of the report. These descriptions, with their discernment of what is distinctive in the several localities, and their recognition of the uniformities found in diverse surroundings inspire confidence in the ability of the investigators and in the trustworthiness of their American advisers. In a general report of one hundred pages the detailed returns are combined, and, on the basis of the figures thus brought together, the American cities are compared one with another and collectively with the British towns. It is to the general report, therefore, that we look for a statement of the methods and of the broad results of the investigation.

For the comparison of wage-statistics three industries were chosen; the building trades, the engineering trades, and printing. In each town the wages in all its leading industries are compiled, but for the comparisons the three that have been named were selected because they were to be found in every town in both countries. Hand-compositors are taken to represent printing; in the building trades six skilled occupations are included; in the

engineering trades four; and in each industry except printing are included returns for unskilled laborers. In the final combinations each of these thirteen sub-trades counts for one. The weekly wage is given in each case, the rates being ascertained from the books of employers. Variations were found in the wages paid by different employers in the same town, so that the predominant range is usually given, instead of a single figure.

In the combination of the local returns to obtain the rates prevailing for the United States as a whole, the predominant range is again given, *e. g.* (p. xvi), wages of bricklayers are stated to range from 110*s.* to 125*s.*, the mean predominant wage (the mean of the limits of the predominant range) being between 110 and 125 shillings in 18 towns, below 110 in four, above 125 in three. In comparing wages in different cities index numbers are used. The mean of the limits of the predominant range in each place is computed as a percentage of the corresponding figure for New York. For comparison with the United Kingdom, the mean predominant wage in each of the thirteen sub-groups in this country is set over against the mean for the corresponding occupation in the British Isles, and these ratios are averaged to obtain a single expression.

As stated in this manner, with wages in New York as 100, the wages of skilled men in the building trades are 110 in Chicago, 108 in St. Louis, 105 in Memphis, 103 in Duluth, and under 100 in all the other cities in the list. By geographical groups, wages in these trades in the five towns of the Middle West are 103; in six New England towns, 82; in four towns in Eastern States, 91; in Six Central towns, 90; and 87 in seven Southern towns. As compared with English wages for the same date, American wages in the specified occupations are as 230 to 100.

Three criticisms on the wage-statistics are offered in the report itself. In the first place, the occupations chosen are too few to afford an entirely adequate basis for comparing wages at large. Secondly, no allowance is made for variations in the degree of skill and in the nature of the task demanded of men in the same nominal occupation in different localities, and especially in different countries. Specifically, the proportion of unskilled to skilled labor is greater in this country than in England. A good share of the work, for instance, done in an English foundry by union moulders is done in an American foundry by recent immigrants for the wage of a day-laborer. Hence, a composite figure based predominantly on the wage of skilled laborers exaggerates the advantage enjoyed by wage-earners in this country. Thirdly, the wage-figures, being given for weekly earnings, not yearly, make no allowance for unemployment, nor for variations of rate throughout the year. In the absence of definite statistics it may be allowable to assume as does that Board of Trade, that unemployment is equally frequent in the same trade in all localities, but an added possibility of error is thereby introduced.

Hours of labor were ascertained in the same manner as wages, and for the same occupations. The comparison with England shows a less number of hours weekly in this country in the building trades (46 to 48¾ as against 52 to 53), a greater number in the engineering trades (56 as against 53)

and 49 hours a week for the printers in the United States as against 52½ in England. Combining the thirteen separate occupations in the three industries, the average number of hours here is to the average in England as 96 to 100.

The facts regarding rents and housing accommodations were obtained from real-estate agents and from tenants, interviewed in their dwellings. Rent-quotations were received for 90,000 families, and for each city the predominant range of rents was established for each of four classes of dwellings, namely, dwellings of three, four, five, and six rooms, respectively. The mode for each class for the whole country was found in the same manner as for wages. The predominant range of weekly rentals in the United States is stated as follows:

For dwellings of 3 rooms	6*s.* 7*d.* to 9*s.* 7*d.*
For dwellings of 4 rooms	8*s.* 8*d.* to 12*s.*
For dwellings of 5 rooms	11*s.* 6*d.* to 14*s.* 11*d.*
For dwellings of 6 rooms	13*s.* to 17*s.* 4*d.*

In order to compare rents in the several cities, the mean predominant range for each class of dwellings for each city was taken, and an index number computed for it, the figure for the same class in New York being taken as the base. The arithmetic mean of the four index numbers for each city is taken for a single rent index number for that city. The results thus obtained show for Manhattan an index number of 109 (Greater New York being 100), for St. Louis, 101, and for other cities numbers ranging from 94 for Pittsburgh down to 44 for Muncie. For the international comparison the mean predominant range for each class of dwellings is contrasted, and then the arithmetic mean of the four ratios thus obtained is taken. Rents in the United States are thus found to be to rents in England and Wales as 209 to 100. This method of combining the results is open to the objection that the arithmetic average of the rentals of the four classes is satisfactory as a basis for comparing rents in different localities only when the distribution of the working population among the four classes of dwellings is approximately the same in every place.

The prices of sixteen articles of food, of coal, and of kerosene in each city were ascertained from retail dealers patronized by the wage-earners. Food-prices, like rents and wages, are expressed, not in a single figure, nor in averages, but as within the range between given limits. The mean of these limits is used when, as for the computation of index numbers, a single figure is required. The use of the predominant range offsets, in a measure, the variations in quality of commodities in different cities. The comparison of prices in the various cities is effected by compiling in each the cost of a week's allowance of food in the quantities used by a typical family. To determine these quantities an estimate was made by the use of the family budgets secured in another branch of the inquiry. The sum needed to purchase this normal allowance in each place was reckoned as an index number, the number required in New York being taken as 100. As thus calculated, Atlanta heads the list at 109, and Detroit shows the

lowest range of prices, with an index number of 91. The Middle West stands at 95, New England at 103. The cost in England of eleven articles in a typical British workingman's food-budget, as estimated in the parallel investigation for Great Britain, is compared with what the same articles would cost at the mean of the predominant prices in this country, and the cost abroad is stated to be to the cost in the United States as 138 to 100. The converse comparison of the cost in the two countries of the same articles in such quantities as appear in the Americal typical budget gives the ratio 125:100. This variation is explained by the omission from the budgets of certain articles, such as biscuit, vegetables and fruit, which play a larger part in the American's dietary than in the Briton's. But the variation illustrates the point, to which the report repeatedly calls attention, that the numerical ratios are not as exact as they appear.

The family budgets already referred to were gathered by the extensive method, and numbered 8,086, of which 464 were rejected. The returns were based on estimates of the transactions of one week, and the schedule called for specifications as to the composition of the family sources and amount of income, and the expenditures for rent, for food in some detail, and for fuel and light. No attempt was made to get at expenditures for other purposes than those mentioned, but the percentage of income remaining after paying for food and housing is tabulated. This method offers an easy way out of the difficulty encountered by those who have gathered family budgets from the days of Sir Frederick Eden, namely, the tendency to overstate the food-expenditure, and so make the expenditures overrun the income. Nevertheless, the tables in the present report do not give evidence that the food account has been inflated; the percentage expenditure for food decreases consistently as income increases, and the actual percentages (47.62 for weekly incomes of from 2 to 3 pounds; 37.78 for incomes of from 4 to 5 pounds) are not greatly in excess of the results reached by American investigators.

The results of the budget inquiry are tabulated by nationality and by income, not by occupation nor, save for the separation of the Northern from the Southern Americans, by locality. The American-British Northern group of 3,215 families, 2,278 of them American-born, is taken as most truly typical of the American standard of living, and the data for this group are used in the comparisons with Great Britain. If we look at the grouping by incomes the range of incomes represented seems high to be taken as typical of the United States at large. Of all the budget families only 3.9 per cent. have incomes under £2 a week, and only one fourth (24.3 per cent.) have incomes under £3 a week, or about $750 a year. One is inclined to regret also that the range of incomes in each group should be so large. In the British report, the groups are made up with intervals of five shillings (25 to 30 shillings per week; 30 to 35, etc.); but the American groups advance by steps of one pound (2 to 3 pounds, 3 to 4, etc.). This amounts to intervals of about $250 in annual income. In the food-calculations no allowance is made for differences in the ages of children, but with as large numbers as are included in these tables variations in this

respect may be considered, perhaps, to offset one another. No attempt is made to estimate the nutritive value of the food-stuffs used.

The striking result of the comparison of the American and British budgets is the larger margin that is left to the American after paying for food and rent. Food purchases demand from 66 to 61 per cent. in the British budgets of families with incomes between 25*s*. and 40*s*. a week, and from 48 to 38 per cent. in the American budgets of families with incomes between two and six pounds a week. In regard to the details of expenditure for food, a larger per capita food-bill is reported by the Americans, a much larger expenditure for meat, a smaller quantity of bread and flour, and from two to four times as much spent for vegetables and fruit.

Food and rent together are found to claim, in American families with incomes under four pounds a week, from 60 to 70 per cent. of the income, and the proportion of food to rent is nearly as three to one. This proportion is used in the calculation of a series of index numbers showing the costs of the two items in the twenty-eight American cities. It is the index numbers of food and for rent, however, and not the actual price-figures, that are weighted in reckoning the new index number, and at this point the procedure is open to the objection that was raised by Mr. J. M. Keynes to the same method in the earlier report of the Board of Trade. Where the index numbers, themselves relative, are weighted, the relative position of the towns may be varied by a change in the base. (See *Economic Journal*, September and December, 1908, as cited by W. C. Mitchell in *Quarterly Journal of Economics*, February, 1909.) It is a question further whether the ratio of food to rent that prevails in the budgets of each locality should not be applied instead of the uniform ratio. As calculated by the Board of Trade, Detroit has the lowest index number for food and rent combined, 83, while only Atlanta with 101 has a higher rating than New York.

In the comparison of food-prices and rent between the two countries, the British ratio of 4:1 is applied to the American index numbers, 138 for food, and 207 for rent, and the resulting ratio of 152:100 is obtained to indicate the greater cost of living in this country. These higher costs are more than counterbalanced by the wage-ratio of 230:200 in favor of the United States. The report does not claim that these figures are an exact measure of the differences between the two countries. But in reaching them a mass of material has been brought together and arranged that will be of permanent value to every student of social and industrial conditions in this country.*

The following table (p. xxviii of the report) exhibits some of the results of the investigation.

* A full abstract of the report may be found in Bulletin No. 93 of the United States Bureau of Labor.

INDEX NUMBERS OF WAGES, RENTS AND RETAIL FOOD PRICES.

TOWNS GROUPED GEOGRAPHICALLY.

Towns.	Wages.					Rents.	Food-Prices.	Rents and Food-Prices Combined.*
	Building.		Engineering.		Printing.			
	Skilled Men.	Laborers.	Skilled Men.	Laborers.	Hand-Compositors.			
New York	100	100	100	100	100	100	100	100
New England Towns:								
Boston	91	77	81	102	90	82	105	99
Brockton	88	102	75	97	83	83	106	100
Fall River	83	64	80	85	76	55	101	90
Lawrence	76	82	78	104	71	64	105	95
Lowell	77	87	68	77	79	52	102	90
Providence	79	73	79	90	90	59	97	88
Mean	82	81	77	93	82	66	103	94
Other Eastern Towns:								
Baltimore	87	86†	83	86	80	54	97	86
Newark	98	93	87	104	94	78	106	99
Paterson	91	73	80	82	86	62	100	91
Philadelphia	86	87†	85	92	86	79	96	92
Mean	91	83	84	91	87	68	100	92
Central Towns:								
Cincinnati	94	100	85	95	86	93	92	92
Cleveland	96	73	86	97	93	64	99	90
Detroit	81	64	80	101	83	57	91	83
Louisville	86	86†	83	97	89	71	99	92
Muncie	83	80	81	97	77	44	98	85
Pittsburgh	98	102	95	90	90	94	102	100
Mean	90	84	85	96	86	71	97	90
Middle West Towns:								
Chicago	110	93	100	108	100	70	94	88
Duluth	103	98	95	113	95	.....	96	.....
Milwaukee	95	87	83	99	81	66	93	86
Minneapolis — St. Paul	97	74	88	109	89	77	95	91
St. Louis	108	117†	89	97	87	101	97	98
Mean	103	88	91	105	90	79	95	91
Southern Towns:								
Atlanta	79	45	87	70†	86	76	109	101
Augusta	73	33†	82	60†	86	58	103	92
Birmingham	97	59†	94	67†	86	81	102	97
Memphis	105	80†	96	85†	90	93	101	99
New Orleans	94	87†	94	104†	90	72	100	93
Savannah	76	50†	96	82†	79	71	104	96
Mean	87	.....	92	.....	86	75	103	96

* Food-prices given weight of 3; rents, weight of 1.

† Relates to the wages of negroes and has not been utilized in the computation of group averages.

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Report of the Public Service Commission for the First District of the State of New York. Vol. III: Statistics of Public Service Corporations. Compiled by the Bureau of Statistics and Accounts. Dated January 10, 1910, and covering the year ending December 31, 1909, pp. 971.

The growth of private monopoly in recent times, and the corresponding increase in the number of businesses "affected with a public interest" (or which the public thinks should be so affected) give to physical or financial facts about street railway, light and power corporations almost the piquant interest of scandal. This report of the Public Service Commission is especially readable; and one no longer doubts, on inspecting it, that the days when "government reports" were a staple article of fuel are passing. I shall mainly outline the plan and contents of this volume and restate some of its more interesting conclusions

The report consists of two parts: Part I "Statistics of Light and Power Companies"; Part II "Transportation Statistics." Each of these two parts contains, first, an analytical text, with brief tables interspersed; these brief tables are derived from longer tables which follow the text, and which in turn, are derived from and followed by abstracts of the original reports of the respondent companies. This arrangement has the merit of accommodating readers of all degrees of industry: the gist is put first, for skimmers; then several tables which merely assemble like figures, without comment, for the more studious; and finally the original source, for the consideration, possibly, of the legislature itself.

The purpose of this report is to give the public an intelligent notion of the condition of the respondent corporations, so far as the Public Service Commission officially knows it. A mere transcript of their reports would do this, in theory; and perhaps actually also, if the report were to circulate only among trained statisticians of abundant leisure. But in reality, the public wants most of the interpretation done before the figures are handed to it. And it is precisely here that this report is better than many similar publications. The meaning of the figures is stated, so far as the Bureau of Statistics can see it, and there is no indication of the attitude sometimes taken by public officials, namely, that only the dryest and most perfunctory text should accompany the formal and formidable tables. This is, fortunately, not the spirit of the present volume.

From the point of view of the teacher of statistics, also, the analysis in this report is important and valuable. Take for instance the determination of the average length of ride on the subway and of its progressive change* which deserves a place in the long awaited statistical "case-book" when it appears. A class in statistics would undoubtedly profit by reading it, as well as others of similar merit in this report, especially if they had previously tried to solve the problems unaided. The subway computation is the work of Statistician George P. Watkins, to whom, and to Statistician Mills E. Case, the preface gives the responsibility for most of the street railway statistics in the book.

* pp. 461 to 487.

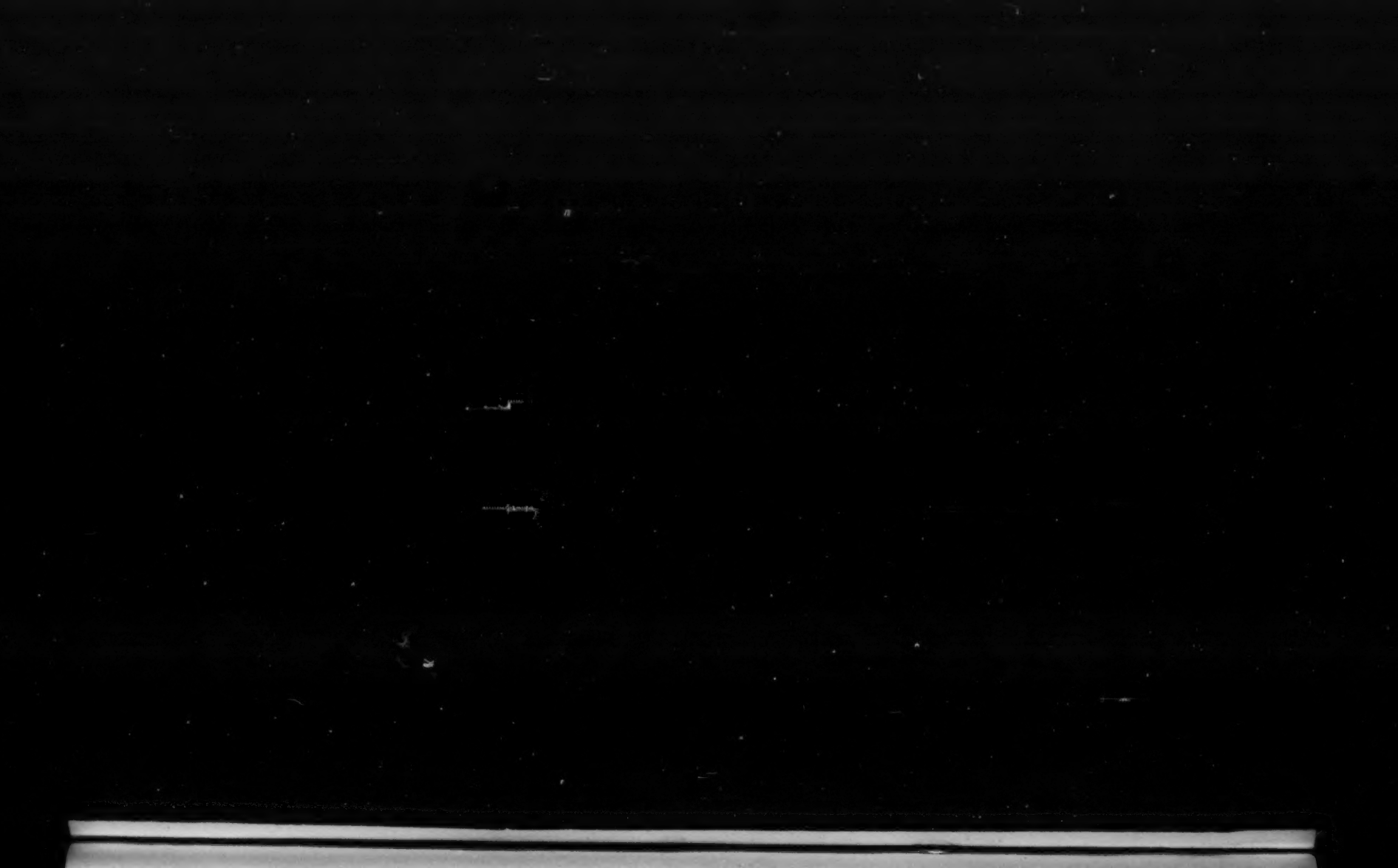
The gathering of these statistics is itself a task requiring no small amount of persistence, tempered by diplomacy, in spite of the legal obligation of the companies to furnish the reports. It is therefore gratifying to learn from Dr. A. F. Weber, the Chief Statistician,* that "as a result, possibly, of the suits brought by the Commission against certain companies in the hands of receivers for failure to file the 1908 reports within the prescribed time, the 1909 returns as a rule were made with commendable promptness and with an apparent disposition to make them complete and satisfactory." The corporations, however, often do not have the figures which the report blank calls for. Better physical statistics are certainly needed.† Corporations are usually in no hurry, moreover, to tell exactly how much and what kind of property they own. In some cases ‡ certain properties "serve the purpose, not of production, but of capitalization." This conclusion is drawn from a consideration of the statistics of output and manufacturing of the two largest gas systems of the First District.

At page 57, there is a suggestion that the reason why the gas companies do not teach consumers that incandescent mantles are cheaper than the open flame burners is that a saving of gas to such consumers would result. But the report as a whole is not at all unreasonably antagonistic in tone to the corporations. The impression which prevails among laymen, that the perplexing intricacy of corporate relations and intercorporate finances is "part of the game" in the sense that the corporations do not wish their status too clearly defined, is evidently shared by the statisticians of the Commission. Curious instances of the results of this practice occur: "The indeterminateness of the title to certain cars of the Metropolitan Street Railway is an obstacle to satisfactory classification." § (This particular instance may be caused by something other than purposeful muddling.) "The passivity of the small investor as regards the management of his property is partly his fault, partly a necessary evil incidental to a situation so complex that the owner of stock cannot really know what is being done with his property."‖ "The group of capitalists composing the Consolidated [Gas] System operates in the name of seven different gas companies in the First District, and of two electrical companies and one subway company, etc. . . . These corporations are not aggregates of individuals. They are agents of the Consolidated Gas Company. . . . The complexities of such corporate aggregations often prevent the public of investors as well as consumers, from knowing essential facts as to the condition of their creatures and servants." ¶ This is plain language, but as these very reports are steps in the betterment of present conditions, it appears to be warranted.

In the section on "Transportation Statistics"** after a statement of the rapid increase in the traffic of the subway at the expense of the surface lines, there is an intimation that the policy of the surface system in New York City, of cutting off transfer privileges, has not resulted in increased profit to the companies, while the public has been given poorer service.

* p. 9. † p. 422. ‡ p. 30. § p. 438. ‖ p. 92. ¶ p. 91. ** p. 446.

The results of the study of the length of ride in the subway are (1) that the average ride is about 5.1 miles, probably less, and (2) that this average ride is increasing on account of the growth of population at the end of the line. It is also said that the average ride is uselessly lengthened by carrying the West Farms passengers a mile or so out of their way by crossing over to Broadway from Grand Central Station, and then back again to Lenox Avenue at 110th Street. The number of passengers so carried is estimated at about 4,000,000 a month; from this the number of corresponding passenger-miles, and then car-miles, and finally, the cost, at 9.84 cents per car-mile, are obtained. The cost is said to amount to "$13,100 a month, or $157,200 a year wasted, in transporting the public out of the line of the direction in which it wants to go and thus performing a disservice." Every curve in a railroad involves a similar "disservice"; but the money does not seem to me to be wasted, for it could not all be saved, even by a straight track from Grand Central Station to 110th Street and Lenox Avenue, for then Broadway passengers would suffer a disservice. The public would rather have crooked railroads than none at all.

By and large, this report is most satisfactory, and shows the effect that the increasing recognition of the importance of statistical training is having in improving government statistical publications—an improvement similar to the one observable in the reports of private corporations with competent statistical departments.

H. A. Richards.